

DOUGLAS

7

MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT CO., INC.

ENGINEERING LABORATORIES & SERVICES
TECHNICAL MEMORANDUM

CATALOG NO. PDL 71174

TO: J. L. Holmgren, A3-860

REPORT NO. TM-DSV-4B-EE-R-5222

FROM: J. L. Whittaker, A-290

DATE 1-9-67SUBJECT: PRESSURE TRANSDUCER HIGH ACCURACY, HEATED
GSE QUALIFICATION TEST, P/N 1B32293-515REQUESTED BY R. Nerone, A3-863COPIES TO: 1-SIVB Stage Des. Branch, D/Q Grp. A-860 (KDCD)
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C. W. Wilson A3-860 (12) NASAE.W.O. 27980 TCD 1707858TEST PLAN & ITEM NO. AA-67SALES ORDER 5779-6105CLASSIFICATION Unclassified
OR RESTRICTION:ABSTRACT

This report presents procedures and results of design qualification tests performed on one P/N 1B32293-515 Transducer, Pressure-High Accuracy, Heated, tested in accordance with DTP 1T14242. The transducer was manufactured by Data Sensors Company, Gardena, California. The transducer was subjected to high temperature (125 F), low temperature (0 F), humidity, electromagnetic interference, proof pressure, and burst pressure. The unit did not meet the specifications for: temperature output voltage during the high temperature test, total error band during the low temperature test, repeatability during the pre-EMI test, repeatability and hysteresis during the post-humidity tests and repeatability during the pre-proof pressure test. All other tests met specifications and tolerances.

DESCRIPTORS

DSV-4B
Pressure Transducer
High Temperature
Low Temperature
Humidity

Pressure Transducer
Electromagnetic Interference
Proof Pressure
Burst Pressure

FACILITY FORM 602

N70-75889

(ACCESSION NUMBER)

98

(PAGES)

CR-113229

(NASA CR OR TMX OR AD NUMBER)

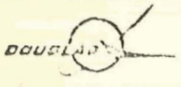
(THRU)

none

(CODE)

(CATEGORY)



		DOUGLAS AIRCRAFT CO., INC. MISSILE & SPACE SYSTEMS DIVISION SANTA MONICA, CALIFORNIA		QUALIFICATION STATEMENT		<input checked="" type="checkbox"/> DE/Q TEST <input type="checkbox"/> FORMAL QUAL	
PROGRAM SATURN		MODEL S-IVB		TEST PLAN LINE ITEM NUMBER		AA-67	
TEST PLAN LINE ITEM TITLE		TRANSDUCER (436)		PART NO.		1B32293-515	
TECHNICAL MEMORANDUM NUMBER(S)		TM-DSV4B-EE-R5222 TM-DSV4B-EE-R5222-1					
REFERENCE TECHNICAL MEMO. NUMBER(S)							
FAILURE AND REJECTION REPORT (FARR) TAG NUMBER(S) AND DISPOSITION				A221310 (Out-of-tolerance during electro-magnetic interference)			
Acceptable to Engineering; continue test.							
(USE CONTINUATION SHEET AS NECESSARY)							
ENGINEERING RESOLUTIONS AND CONCLUSIONS							
<p>During qualification testing of this transducer, only one major problem was encountered. This occurred during the electro-magnetic interference and susceptibility test. Out-of-tolerance conditions were seen during several phases of the test, which were reported to the cognizant design section. A review of the transducer's function and installation resulted in accepting the test results as satisfactory. It was considered that the out-of-tolerance conditions would not appreciably affect the performance of the part.</p>							
(USE CONTINUATION SHEET AS NECESSARY)							
STATEMENT OF QUALIFICATION							
<p>Based upon the qualification test results presented in the attached reports, it is the conclusion of the Douglas Aircraft Company, Inc., that the above item is qualified for use as intended.</p>							
ORIGINATOR 11-11-66 <i>J. Woods</i> <i>A. Smith</i> 11-11-66		DESIGN TECHNOLOGY BRANCH CHIEF <i>JP Morata</i> 11/2/67		DESIGN TECHNOLOGY CHIEF ENGINEER <i>JP Morata</i> <i>J. D. Shultz</i>			
TITLE							
RELIABILITY ENGINEERING		PROJECT OFFICE TEST BRANCH					

PREFACE

This test report presents detailed requirements, procedures, and results of qualification tests performed on one Pressure Transducer, High Accuracy, Heated, P/N 1B32293-515. The tests were conducted in the Guidance and Control Laboratory (A-293) of the Missile and Space Systems Division during the period 21 July 1966 to 5 August 1966.

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1.0 INTRODUCTION

This report presents the detailed procedures and results of qualification tests performed on one High Accuracy, Heated, Pressure Transducer, P/N 1B32293-515 S/N 160, manufactured by Data Sensors Company, Gardena, California.

1.1 Purpose of Test

The purpose of the test was to qualify one pressure transducer for use on the SIV-B Pneumatic Checkout Console Model 436.

The testing effort was authorized by S.O. 5779-6105, EWO 27980. Reference TCD 1T07858 and DTP 1T14242.

1.2 Physical Description

The pressure transducer system consists of a strain gauge pressure sensor and a solid state amplifier in an integral case. The assembly weighs approximately 2.55 pounds. See addendum pages A-1 and B-1 for relative size.

1.3 Functional Description

The pressure transducer system is used as a pressure sensor for the gaseous nitrogen purge lines in the SIV-B Pneumatic Checkout Console. The system operates from a 28 vdc source and provides a 0 to 5 vdc isolated output signal proportional to applied pressure input from 0 to 400 psia. It contains a heating device which maintains a constant internal transducer-amplifier temperature with a temperature monitor output for monitoring the internal temperature. The heater operates on unregulated 28 vdc.

2.0

SPECIMEN DESCRIPTION

Name: Transducer - Pressure, High Accuracy, Heated
GSE
Part No: 1B32293-515
Serial No: 160
Quantity: 1
Manufacturer: Data Sensors Company, Gardena, California
Vehicle Model No: DSV-4B

3.0

REQUIREMENTS

3.1

Test Sequence

The tests shall be performed in the sequence outlined below.

The sequence may be changed by mutual agreement between the test engineer and the cognizant design qualification engineer.

Each of the environmental tests shall be preceded by a pre-test and followed by a post-test which are described further in paragraph 3.2.

TESTDESCRIPTION

1	Pre-Environmental Tests
2	High Temperature
3	Low Temperature
4	Humidity
5	Electromagnetic Interference
6	Proof Pressure
7	Post Environmental
8	Burst Pressure

3.2

Pre- and Post-Tests

3.2.1

A pre-test shall be performed prior to each environmental test and a post-test upon completion of each environmental test. The tests are identical and consist of the following portions of the pre-environmental tests:

1. Insulation Resistance
2. Isolation Resistance
3. Amplifier Output Voltage Calibration
4. Regulation

3.2 Pre- and Post-Tests (Cont'd)

3.2.2 If the elapsed time between a post-test of a specific environment and the next environmental test is less than 72 hours, the intervening pre-test of the next environment need not be performed, if no significant change in ambient conditions has occurred. However, if there is a 72-hour or longer delay between the performance of a pre-test and its associated environmental test, the pre-test shall be repeated before the environmental test is performed.

3.3 Recording of Test Data

Test preparations and testing shall be conducted by the A-293 Group AEC4 test engineer. All test data shall be recorded on test data sheets. Each test data sheet shall be completed and approved by the test engineer prior to starting the next test. Photographs of UUT, test setups, and testing, shall be taken as required.

3.4 Test Equipment Certification

All equipment shall be certified by Douglas MSSD in accordance with MIL-C-45662A and NPC-200-2 which are described in SPB 711.1. Maintain a record of all equipment used. This record shall include:

1. Name of equipment
2. Model Number
3. Serial Number
4. Ownership
5. Manufacturer

3.5 Standard Conditions

Unless specified otherwise, tests and measurements shall be performed with the unit under test (UUT) stabilized as follows:

Temperature: $77^{\circ}\text{F} \pm 18^{\circ}\text{F}$
Relative Humidity: 90% or less
Barometric Pressure: 24 to 32 inches Hg

3.6 Tolerances

Unless specified otherwise, tolerances shall be as follows:

Temperature: $\pm 4^{\circ}\text{F}$
Relative Humidity: $\pm 5\%$, -0%
Altitude: $\pm 5\%$ (in feet)
Input Power Amplitude:
 1. Signal Amplifier ± 2.8 vdc
 2. Heater ± 4.0 vdc
Input Operating Pressure (GN_2)
 1. High (above 1 psia) ± 0.4 psia
 2. Low (under 1 psia) ± 0.001 psia
Load Resistance: $50\text{K} \pm 1\%$ ohms, $\frac{1}{2}$ watt min.

3.7 Pressure Agents

The pressure agents for these tests shall be Grade A gaseous nitrogen, except during the leakage tests which will utilize Grade A gaseous helium.

3.8 Damage or Failure

If the UUT fails or is damaged in any way, the testing shall be stopped at the time of the incident. There shall be no change or alterations made in the testing configuration during the stopped period. The test engineer shall be notified and in turn shall notify the design qualification engineer. Testing shall resume upon approval of the test engineer. In the event

3.8 Damage or Failure (Cont'd)

of a failed or rejected part, ensure that SPB 710.2 Failure and Rejection Report is completed and sufficient photographs taken.

3.9 UUT Specifications

3.9.1 Insulation Resistance

The insulation resistance shall be 50 megohms minimum at 50 vdc, at room ambient conditions, measured between shorted pins A and D of connector J1 and case and shorted pins B and C of connector J1 and case, also between shorted pins A, B, D, and E of connector J2 and case.

3.9.2 Isolation Resistance

The isolation resistance shall be 10 megohms minimum at 50 vdc, at room ambient conditions, measured between shorted pins A and D and shorted pins B and C of connector J1.

3.9.3 Continuity Check

Continuity shall exist between pin C of connector J2 and case.

3.9.4 Terminal Linearity

The maximum deviation from a straight line through the end points shall not exceed 0.25% of full scale for the increasing pressure calibration within the temperature range of +125°F to 0°F.

3.9.5 Hysteresis

The maximum difference between the increasing pressure and decreasing pressure calibration curve shall be 0.20% of full scale, within the temperature range of +125°F to 0°F.

3.9.6 Repeatability

The calibration curve of the transducer shall be repeatable within $\pm 0.1\%$ of full scale for successive calibrations made under identical conditions within the temperature range of $+125^{\circ}\text{F}$ to 0°F .

3.9.7 Regulation

The transducer output shall not change by more than 0.20% of full scale, referenced to the output at 28 vdc, for voltage input variations from 25.2 to 30.8 vdc, with 400 psia at the pressure port, and within the temperature range of $+125^{\circ}\text{F}$ and 0°F .

3.9.8 Output Voltage

The output voltage shall be 0.1 ± 0.1 vdc at zero psia input and 4.9 ± 0.1 vdc at 400 psia input within the temperature range of $+125^{\circ}\text{F}$ and 0°F .

3.9.9 Output Ripple

The amplifier output ripple voltage or wide band noise shall not exceed 35 mv peak-to-peak.

3.9.10 Output Impedance

The transducer amplifier output impedance shall not exceed 800 ohms.

3.9.11 Frequency Response

The amplifier frequency response shall be equal to or greater than 40 hz with 400 psia abruptly released at the pressure port.

3.9.12 Total Error Band

The UUT shall maintain a total error band of 0.5% of full-scale within the temperature range of +125°F to 0°F.

3.9.13 Transient Currents

Interconnecting cables shall withstand, without evidence of equipment performance degradation the application of induced transients resulting from a 28 vdc power supply being switched on and off at the approximate rate of once per second.

3.9.14 EMI

The DC output level shall not change more than 3 millivolts during susceptibility tests. The ripple voltage shall not exceed 35 millivolts peak-to-peak.

3.9.15 Amplifier Current Drain

The current drain shall not exceed 60 ma with 28 ± 2.8 vdc applied to pins A and D of connector J1 and a 50K ohm resistor between pins B and C of connector J1.

3.9.16 Heater Current Drain

The heater current drain shall not exceed 900 ma with 28 ± 4 vdc applied between pins A and B of connector J2.

3.9.17 Leakage

The leakage shall not exceed 10^{-6} standard cc of helium per second with the UUT in a chamber pressure of 100 microns.

3.9.18 Proof Pressure

The UUT shall withstand 600 psia for five minutes without failure.

3.9.19 Burst Pressure

The UUT shall withstand a gradually-approached 10,000 psia minimum without evidence of rupture.

3.10 Environmental Test Requirements

3.10.1 High Temperature Test

The UUT shall be placed in the temperature chamber at ground atmospheric pressure and the unit allowed to stabilize at $+125 \pm 4^{\circ}\text{F}$ as measured by a thermocouple mounted on the test unit. After temperature stabilization, a 50K ohm load resistor shall be connected across pins B(+) and C(-) of connector J1 and heater power applied. (See addendum page A-2) Measure and record the heater temperature monitor output between pins D(+) and E(-) of connector J2 within one minute. The heater temperature monitor output voltage shall be $90 \pm 10\text{mV}$. Amplifier power and 400 psia shall be applied to the UUT and the UUT subjected to $125^{\circ}\text{F} \pm 4^{\circ}\text{F}$ temperature for a total period of 12 hours. Once every 2 hours the output voltage shall be monitored and recorded between pins B and C of connector J1. The output voltage at 400 psia shall be $4.9 \pm 0.1\text{ vdc}$ and the ripple voltage or wideband noise shall not exceed 35 mv peak-to-peak. At the end of this exposure period and while still at this temperature, the

3.10.1 High Temperature Test (Cont'd)

amplifier output voltage calibration test shall be performed. All power shall then be removed, the UUT allowed to return to room ambient temperature and stabilized and a resistance test performed.

A 50K ohm load shall be connected across pins B and C of connector J1, and heater power applied. (See addendum page A-2.) Within one minute the output voltage shall be measured and recorded between pins D(+) and E(-) of connector J2. The amplifier output voltage calibration and regulation tests shall then be performed.

3.10.2 Low Temperature Test

The UUT shall be placed in a temperature chamber and allowed to stabilize at $0^{\circ} \pm 4^{\circ}\text{F}$. After temperature stabilization, a 50K ohm load resistor shall be connected across pins B(+) and C(-) of connector J1 and heater power applied. The heater temperature monitor output between pins D(+) and E(-) of connector J2 shall be measured and recorded within 1 minute. The heater temperature monitor output voltage shall be 90 ± 10 mv. Amplifier power and 400 psia shall be applied to the UUT and the UUT subjected to $0^{\circ} \pm 4^{\circ}\text{F}$ temperature for a total period of 12 hours. Once every 2 hours the output voltage between pins B and C of connector J2 shall be monitored and recorded. The output voltage at 400 psia shall be 4.8 ± 0.1 vdc. The ripple voltage or wideband noise shall not exceed 35 mv peak-to-peak. The amplifier output voltage calibration

3.10.2 Low Temperature Test (Cont'd)

test shall be performed at the end of this exposure period and while still at this temperature. Power shall then be removed from the UUT and the chamber temperature increased to $32 \pm 4^{\circ}\text{F}$ and the unit allowed to stabilize at this temperature. After temperature stabilization heater power shall be applied to the UUT and the output impedance of the heater monitor measured and recorded within one minute as follows:

1. Record the open circuit voltage between pins D(+) and E(-) of connector J2.
2. Connect a 10K ohm decade resistance box to the pins D(+) and E(-) of connector J2 in step 1 above; decrease the resistance until output is 90% of open circuit value. Divide final decade resistance by 9. Record this value which shall not exceed 800 ohms.

All power shall then be removed and the UUT allowed to return to room ambient temperature and stabilize.

3.10.3 Humidity

Perform a pre-test per paragraph 3.2.1 unless paragraph 3.2.2 applies. A humidity chamber temperature shall be adjusted to between 68° and 100°F with uncontrolled humidity. Place the UUT in the humidity chamber and during the first 2 hour period gradually raise the temperature to 160°F . This temperature shall be monitored for a total period of 6 hours. During the following 16 hour period, the chamber temperature shall be gradually reduced to a temperature between 68° and 100°F . This constitutes one complete cycle, which is equal to 24

3.10.3 Humidity (Cont'd)

hours. Insulation and isolation resistance tests shall be performed and the insulation resistance shall be 10 megohms minimum at 50 vdc. A total of 10 cycles (240 hours) shall be performed and the relative humidity throughout each cycle shall be at least 95%. At the end of 10 cycles (240 hours) the humidity chamber shall be turned off and the UUT returned to standard conditions. A post-test shall be performed as soon as possible while the UUT is still wet. The insulation resistance shall be 10 megohms minimum at 50 vdc.

3.10.4 Electromagnetic Interference and Susceptibility Tests

The electromagnetic interference and susceptibility tests shall be accomplished by the Electromagnetic Radiation (EMR) Laboratory which shall provide the detailed test procedure, test equipment and data sheets as applicable.

3.10.5 Proof Pressure Test

The UUT shall be connected per addendum page A-3. Perform a pre-test per paragraph 3.2.1 unless paragraph 3.2.2 applies. The pressure shall then be gradually increased from 0 to 600 psia and held for 5 minutes with the transducer output voltage measured and recorded from 400 to 600 psia in 25 psi increments.

3.10.6 Burst Test

NOTE

No pre- and post-tests required for this burst test.

3.10.6 Burst Test (Cont'd)

The UUT shall be properly barricaded at room environment and the pressure at the inlet port gradually increased until a minimum burst pressure of 10,000 psia is reached. The pressure shall then be reduced to atmospheric and the UUT inspected. The transducer case shall withstand the applied pressure without rupture.

4.0 PROCEDURES AND RESULTS

The procedures and results of the environmental tests are described in the following paragraphs. Equipment used in testing the system is identified by name, manufacture, model number, and serial number. See addendum page A-4. (Reference addendum page B-2 for instrumentation setup.) All functional calibrations are presented on computer printout sheets. An explanation of the sheets is as follows:

For each calibration run there exists: 1) one page per trial with linearity and hysteresis and 2) one page with repeatability.

An explanation of the linearity and hysteresis page is as follows:

1. The title indicates the type of curve fit used in determining linearity. A terminal linearity curve fit indicates that a line was fit through the up-sweep endpoints.

4.0

PROCEDURES AND RESULTS (Cont'd)

1. (Cont'd)

The title also identifies the part number, serial number, date of test, title of test, and trial number.

2. Slope and intercept are the slope and intercept of the fitted line.
3. Input X and input Y1 are the coordinates of the data to be fitted. Input X is the abscissa and is the transducer input pressure expressed as percent of rated full scale pressure. Input Y1 is the ordinate and is the transducer output in volts.
4. Output F is the value of Y on the fitted line for the corresponding input X.
5. Residual Y1-F is the deviation of each data point from the determined line.
6. Input Y2 is the ordinate value of the downsweep curve for the corresponding values of X.
7. Hys Y1-Y2 is the subtraction of input Y1 from input Y2 which is the hysteresis of each point at the given value of X.
8. Full scale is the full scale output range of Trial A upsweep. This value is in volts.
9. The largest absolute value in item (5) expressed as actual deviation and percent of full scale is presented at the top of the page.

4.0

PROCEDURES AND RESULTS (Cont'd)

10. The largest absolute value in item (7) expressed as actual difference and per cent of full scale is presented at the top of the page.

An explanation of repeatability is as follows:

1. The title indicates the type of repeatability criteria used for determining repeatability. The title "Repeatability" indicates that the maximum difference between any two trials is recorded for each output value. If a trial was all zeros, the trial was not recorded and therefore not used in repeatability calculations. The title also identifies the part number, serial number, date of test and title of test.
2. The trials are the transducer outputs from input pressures of 0 to 100% of full scale and back to 0.
3. Differences are the maximum absolute difference found for each input pressure.
4. The largest value found in item (3) expressed as actual difference and per cent of full scale is presented at the top of the page.
5. Full scale is the full scale output range of Trial A upsweep. This value is in volts. The per cent full scale for linearity, hysteresis, and total error band is presented in the "E Format". The "E Format" indicates that the three characters after

4.0 PROCEDURES AND RESULTS (Cont'd)

5. (Cont'd)

the letter "E" determine the power of ten that the first ten digits in the number are to be multiplied by. For example, 0.988 XXXX E-02 equals 0.00988.

4.1 Visual and Mechanical Inspection

The UUT was identified and visually examined for scratches, dents, burrs, chips, defective threads, bent connector pins, etc., prior to beginning the pre-environmental tests. No defects were noted.

4.2 Pre-Environmental Tests

4.2.1 Leakage

The pressure transducer was subjected to a leakage test at room ambient temperature. The Veeco vacuum chamber was first cleaned with acetone. The UUT was placed in the vacuum chamber so that the pressure inlet port was vented to the atmosphere. The chamber pressure was reduced to 100 microns. The leakage rate was less than the specification of 10^{-6} standard cc of helium per second, see addendum page C-1.

4.2.2 Insulation Resistance

The insulation resistance was measured and recorded between the case to pins A & D shorted on the J1 connector using a 50 vdc insulation tester. The insulation resistance was measured and recorded between the case to pins B & C shorted on the J1 connector using a 50 vdc insulation tester. The insulation resistance was greater than 50 megohms. The insulation resistance was measured and recorded between the

4.2.2 Insulation Resistance (Cont'd)

case and pins A, B, D, and E shorted together and was greater than the 50 megohm requirement. See addendum page C-1.

4.2.3 Isolation Resistance

The isolation resistance was measured and recorded between pins A & D shorted and pins B & C shorted on the J1 connector using a 50 vdc insulation tester. The isolation resistance was greater than the specification of 10 megohms under room ambient conditions. See addendum page C-1.

4.2.4 Continuity Check

Pin C of connect J2 was verified as shorted to the transducer case by using a Simpson 260. See addendum page C-1.

4.2.5 Input Power Current

The input power current of the amplifier was measured using a load of 50K ohms. The input power of 28 ± 0.1 vdc was applied between pin A(+) and D(-) of connector J1 and the load was connected between pin B & C of connector J. Also, the input power current was measured with the output shorted, open circuited and then with the input voltage polarity reversed. All measurements were in the tolerances specified. See addendum page C-1.

The input power current of the heaters was measured by applying a 28 ± 0.1 vdc between pins A(+) and B(-) of connector J2. The heater input current did not exceed 900 ma and therefore met the specification. See addendum page C-1.

4.2.6 Pressure Calibration

The output voltage of the transducer was measured and recorded as the input pressure was applied 0% to 100% to 0%

4.2.6 Pressure Calibration (Cont'd)

of full scale at 10% full scale increments. The transducer output at zero psia met the specification of 0.1 ± 0.1 vdc. The transducer output at 400 psia met the specification of 4.9 ± 0.1 vdc. See addendum page C-2. For the increasing pressure calibration, the maximum deviation from a straight line through the end points (terminal linearity) met the specification of $\pm 0.25\%$. The maximum difference in output voltage between the increasing pressure and decreasing pressure calibration curves (hysteresis) met the specification of $\pm .20\%$ of full scale. See addendum pages C-3, C-4, and C-5. The calibration curve of the transducer was repeatable within $\pm 0.1\%$ of full scale for successive calibrations made under identical conditions. See addendum page C-2.

4.2.7 Regulation

With 400 psia applied to the pressure port of the transducer, the output was monitored as the voltage input was varied from 25.2 to 30.8 vdc. The maximum change of the output when compared to the output at an input of 28 vdc was within the specification of $\pm 0.20\%$ regulation. See addendum page C-6.

4.2.8 Amplifier Output Ripple

The output voltage ripple was measured and recorded at an input pressure of 100% of full scale of the transducer. The output ripple was less than the specification of 35 mv peak-to-peak. See addendum page C-6.

4.2.9 Amplifier Output Impedance

The open circuit output voltage was measured at pins B & C of connector J1 with 400 psia pressure applied to the pressure port. Starting with a decade resistance of at least

4.2.9 Amplifier Output Impedance (Cont'd)

10K ohms connected to the output pins, the decade resistance was decreased until the output was 90% of its open circuit value. The output impedance was then determined by taking the decade resistance and dividing by nine. The output impedance was less than 800 ohms, and thus met the specification. See addendum page C-7.

4.2.10 Amplifier Frequency Response

After power was applied to the UUT for one hour at ambient conditions, the full rated pressure of 400 psia was applied to the pressure port. The pressure was explosively released by rupturing the mylar diaphragm while recording the amplifier output voltage trace of a memoscope on polaroid (type 46L) film. See addendum page C-8. However, this method did not produce an acceptable waveform. The transient response had no overshoot, therefore another method was used. In the second method the pressure was explosively released into the UUT by rupturing the mylar diaphragm. A transient response was obtained. The frequency response of the amplifier system met the specification. See addendum page C-7.

4.3 High Temperature Test

The UUT was placed in the temperature chamber at ground atmospheric pressure and allowed to stabilize at $+125 \pm 4^{\circ}\text{F}$ as measured by a thermocouple mounted on the test unit. See page B-3. After the temperature had stabilized, a 50K ohm resistive load was connected to the UUT and then heater power was applied. After one minute following the applica-

4.3

High Temperature Test (Cont'd)

tion of heater power, the temperature monitor output of the UUT was measured using a Cimron Digital Voltmeter, model 7500 with an accuracy of 0.01% of reading ± 1 digit and then recorded. The temperature output voltage did not meet the specification of 90 ± 10 mv. See addendum page C-9.

Amplifier power was applied and the input pressure was raised to 400 psia. The UUT was subjected to the temperature of $125 \pm 4^\circ\text{F}$ for a total period of 12 hours. The output voltage was measured once every 2 hours using a Cimron Digital Voltmeter, model 7500. The ripple voltage or wideband noise was also measured and did not exceed 35 mv peak-to-peak. The output voltage did not meet the specification of 4.9 ± 0.1 vdc because the input pressure was at 400 psig (gauge pressure) and not at 400 psia (absolute pressure) therefore the output voltage was too high. The last reading of the 12 hour temperature test was in tolerance because the input pressure was at the correct pressure of 400 psia. See addendum page C-9.

While still maintaining the $125^\circ \pm 4^\circ\text{F}$, the amplifier output voltage calibration test was performed. The terminal linearity, hysteresis, total error band, and repeatability were all within the specifications and tolerances for the calibration run. See addendum pages C-10, C-11, C-12, C-13, and C-14.

4.4

Low Temperature Test

A pre-low temperature test was performed which also served as the post-high temperature test. The pre-test consisted of an insulation resistance test, an isolation/insulation test, a continuity test, an amplifier voltage calibration test, and an amplifier output regulation test. The specifications were met for each test. See addendum pages C-15 through C-19.

The UUT was placed in the temperature chamber and allowed to stabilize at $0^{\circ}\text{F} \pm 4^{\circ}\text{F}$. See page B-4. After the temperature had stabilized, power was applied to the amplifier and 400 psia to the UUT. The UUT was subjected to $0^{\circ} \pm 4^{\circ}\text{F}$ temperature for a total period of 12 hours. Once every 2 hours the output voltage was measured and recorded. The output voltage was measured using a Cimron, Model 7500. The output voltage did not meet the specification of $4.8 \pm 0.1 \text{ vdc}$. See addendum page C-20. Some of the out-of-tolerance readings could be attributed to the low temperature to which the UUT was subjected. During the test the solenoid in the liquid nitrogen system remained open at three different times. During these three times the temperature of the UUT dropped to -255°F , -230°F and -140°F before being corrected.

After the 12-hour exposure period and while still maintaining the low temperature, the amplifier output voltage

4.4

Low Temperature Test (Cont'd)

calibration test was performed. The linearity, hysteresis and repeatability of the pressure calibrations met all the required specifications. The output voltage regulation test was then performed. The UUT met the specification of 0.20%. The UUT did not meet the total error band requirement of $\pm 0.5\%$ of full scale. The maximum error was -0.601% . See addendum pages C-21 through C-25.

Power was removed from the UUT and the chamber temperature increased to $+32^{\circ}\text{F}$ and allowed to stabilize. The output impedance of the heater monitor was then measured. The output impedance did not exceed 800 ohms at 32°F . See addendum page C-26.

A post-low temperature test was performed that consisted of an insulation resistance test, an isolation resistance test, an amplifier output regulation test, and an amplifier voltage calibration. All tests results were within the specifications and tolerances defined in the detailed test procedure requirements paragraph 3.0. See addendum pages C-27 through C-31. However, the UUT was not capable of maintaining a total error band which included thermal effects, hysteresis, non-repeatability, and input power variations of $\pm 0.5\%$ of full scale referenced to the room temperature curve at any temperature from 0 to 125°F , during the preceding temperature test. A check of the total error band was not made on

4.4 Low Temperature Test (Cont'd)

the temperature monitor because no vendor furnished calibration data was supplied with the UUT in receiving.

4.5 Electromagnetic Interference and Susceptibility Test (EMI)

A pre-EMI test was performed which consisted of an amplifier output regulation test, an isolation and insulation resistance test, and an amplifier voltage calibration. All test results met the test requirements and tolerances except the repeatability specification of $\pm 0.1\%$ for the pressure calibrations. The repeatability was 0.102%. See addendum pages C-32 through C-37.

The electromagnetic interference and susceptibility tests were accomplished by the Electromagnetic Radiation (EMR) Laboratory which provided the detailed test procedure, test equipment and data sheets as applicable. The results of this test are presented in TM-DSV-4B-EE-R-5222-1.

A post-EMI test was performed which consisted of an amplifier regulation test, an isolation and insulation resistance test, and an amplifier voltage calibration. All test results met the test requirements and tolerances. See addendum pages C-38 through C-42.

4.6 Humidity

The UUT was placed in a humidity chamber and tested as required in paragraph 3.10.3. The insulation and isolation

4.6 Humidity (Cont'd)

resistance was measured at the end of each cycle. All resistance tests were within the specifications and tolerances. See addendum page C-43.

A post-humidity test was performed. The test consisted of an amplifier regulation test and an amplifier voltage calibration. The regulation test met specifications, but some of the specifications of the calibration test were not met. The repeatability and hysteresis were out of specification. See addendum pages C-44 through C-47.

4.7 Proof Pressure

A pre-proof pressure test was performed. The test consisted of an amplifier voltage calibration. The UUT did not meet all the specifications. The UUT did not meet the repeatability specification of 0.1%. The repeatability was 0.104%. See addendum pages C-48 through C-51.

The proof pressure test was performed as required in paragraph 3.10.5. The transducer output voltage from 400 to 600 psia in 25 psi increments was measured and recorded. See addendum page C-52.

4.8 Post-Environmental

The post-environmental test was performed. The test was identical to the pre-environmental test as described in paragraph 4.2. All results were within the required specifications and tolerances. See addendum pages C-53 through C-59.

4.9

Burst Test

The pressure was gradually increased at the inlet port until a minimum burst pressure of 10,000 psia was reached. The pressure was reduced to atmospheric and the UUT was inspected and no rupture was found.

C. D. Bering
C. D. Bering
Test Engineer

Shw
R. E. May
Group Engineer

J. L. Whittaker
J. L. Whittaker, Chief
Guidance & Control Laboratory
Electronics Department

PREPARED BY: C.D. BERING

DOUGLAS AIRCRAFT COMPANY, INC.

PAGE: A-1

CHECKED BY: _____

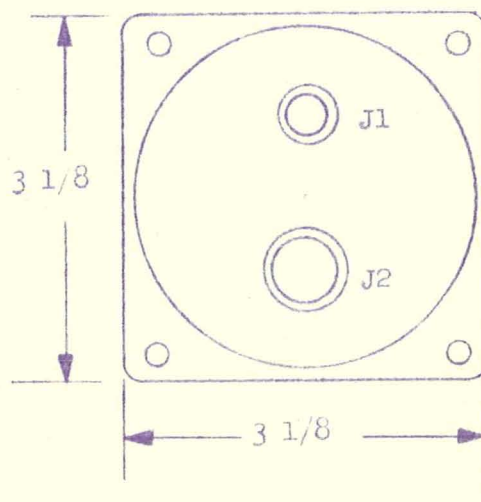
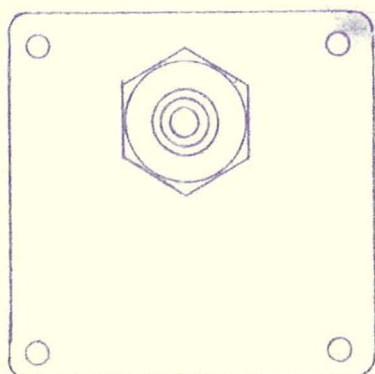
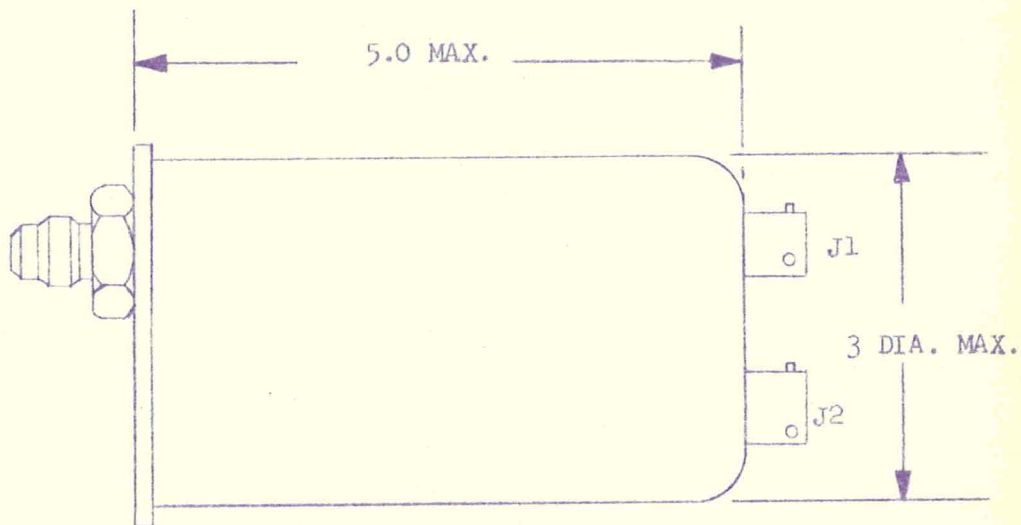
MISSILE & SPACE SYSTEMS DIVISION

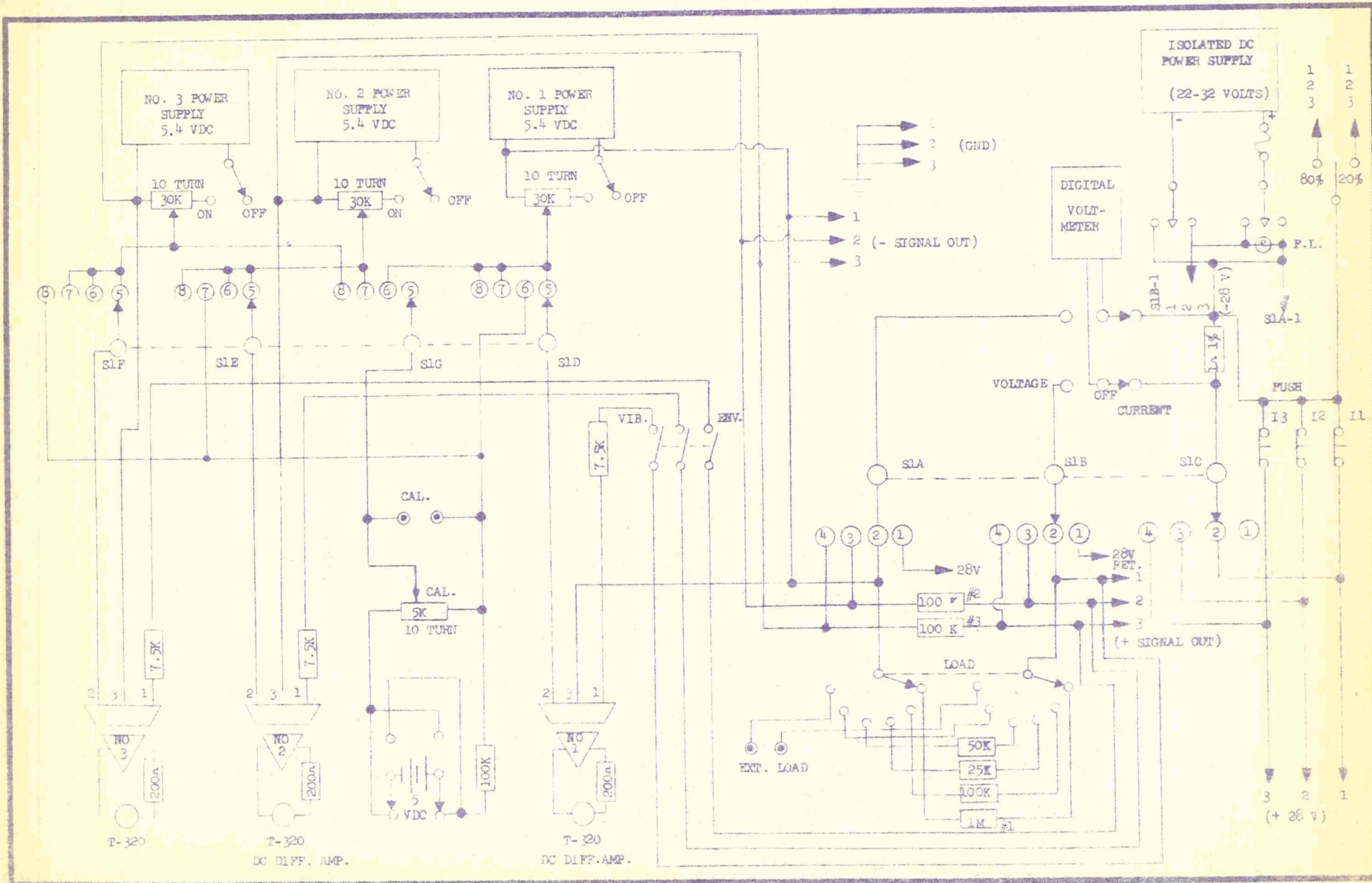
MODEL: DSV-4B

DATE: _____

TITLE: OUTLINE - PRESSURE TRANSDUCER P/N 1B32293-515

REPORT NO.: TM-R-5222





NOTE: MAY BE USED FOR THREE UNITS.

DOUGLAS AIRCRAFT COMPANY, INC.

PREPARED BY: AAA

CHECKED BY:

DATE:

TITLE:

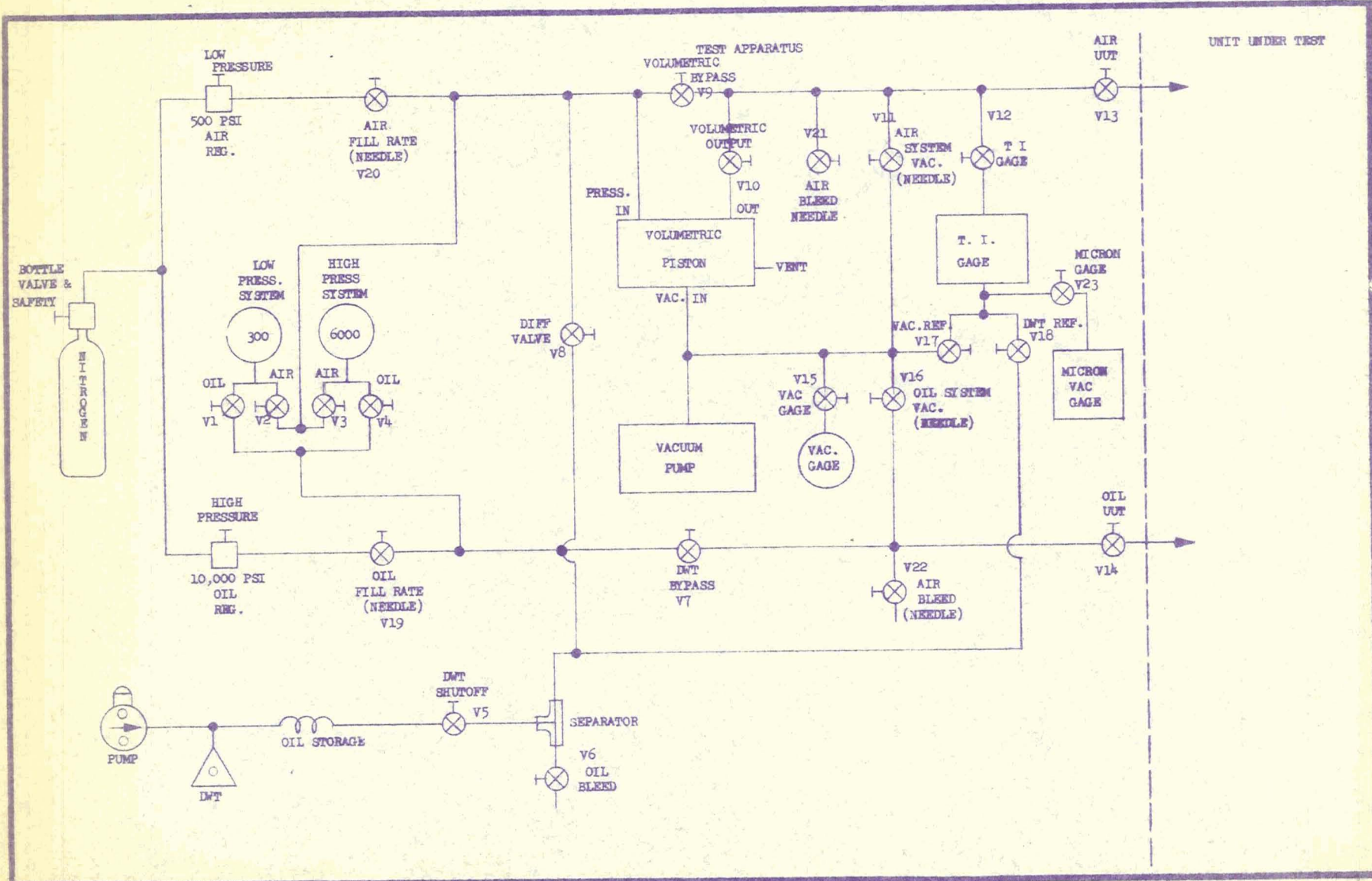
MISSILE & SPACE SYSTEMS

DIVISION

MODEL

PRESSURE TRANSDUCER CONSOLE - PNEUMATIC

REPORT NO



PREPARED BY: C.D.BERING
CHECKED BY: _____
DATE: _____
TITLE: _____

DOUGLAS AIRCRAFT COMPANY, INC.

MISSILE & SPACE SYSTEMS

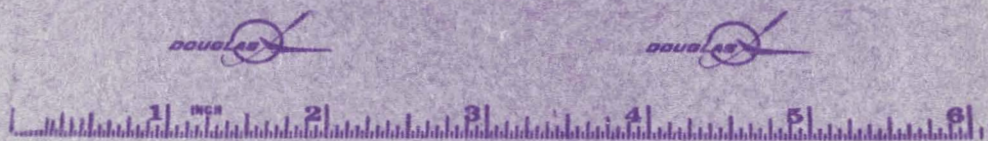
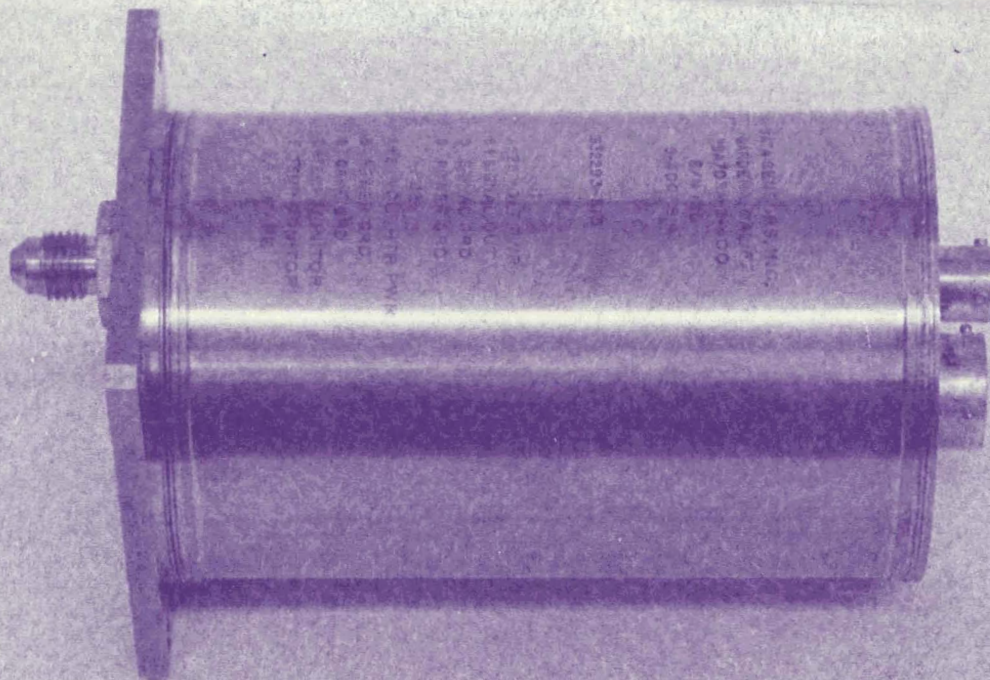
DIVISION

PAGE: A-4
MODEL: DSV-4B
REPORT NO.: TM-R-5222

EQUIPMENT LIST

<u>ITEM</u>	<u>MANUFACTURER</u>	<u>MODEL NO.</u>	<u>SERIAL NO.</u>
Precision Pressure Gage	Texas Instr.	141	135
Precision Pressure Gage	Texas Instr.	141A	311
Fused Quartz Pressure Tube (500 PSIA)	Texas Instr.	_____	807
Fused Quartz Pressure Tube	Texas Instr.	_____	_____
Digital Integrating Voltmeter	Cimron	7500A	3051
Digital Integrating Ratiometer	Cimron	7500A	2765
Power Supply	Kepco	SC-32-5	048955
Power Supply	Kepco	SC-32-5	_____
Power Supply	Universal	Q-24-28-6A	728
Oscillograph	CEC	5-124	_____
Oscillograph	CEC	5-124	_____
DC Amplifier	Dynamics	6451	6452-0005
DC Amplifier	Dynamics	6451	_____
Amplifier	Dynamics	6456	6447-0006
Amplifier	Dynamics	6456	6447-0002
Voltmeter	Fluke	803	_____
Megger	Industrial	L-6B	_____
Galvanometer	CEC	7-326	_____
		7-315	_____
		7-362	_____
Minimite	Thermo Electric	80236	AB6901-75
Temp. Regulator	Barber Coleman	292P	_____
Pressure Gage (0-60)	Seegers	SS-2170-60	_____
Pressure Gage (0-6000)	Seegers	SS-2170-6000	_____
Pressure Gage (0-300)	Seegers	SS-2170-300	_____
Oscilloscope	Tektronix	533	009913
Oscilloscope	Tektronix	535A	022044
Vacuum Gage	Consolidated Vacuum	GP110	20106A

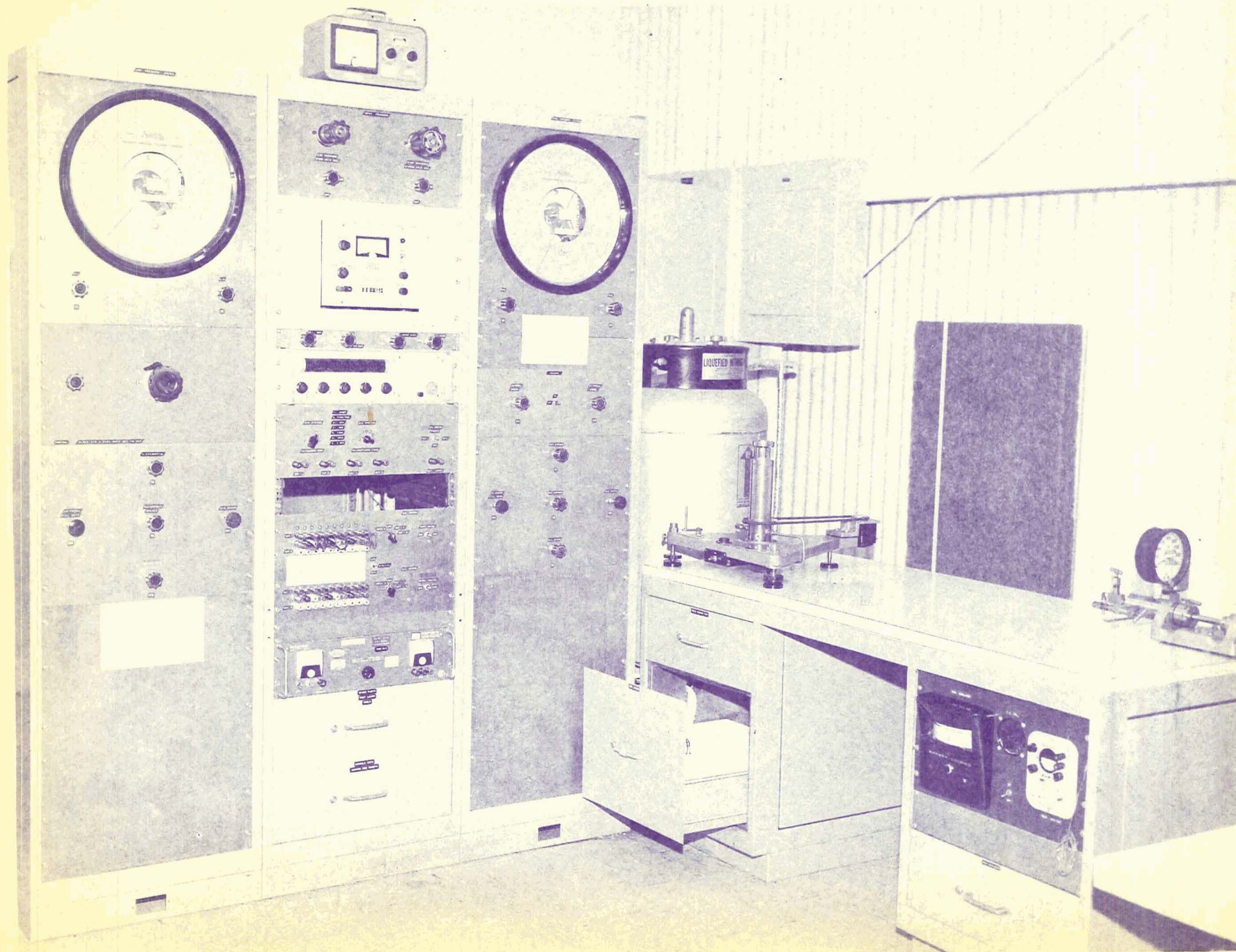
PRESSURE TRANSDUCER



GTP: AA67

DSV-4B

PRESSURE TRANSDUCER P/N 1B32293-515 S/N 160



TEST CONSOLE

PHOTO SM 476922

DOUGLAS AIRCRAFT COMPANY, INC.

PREPARED BY: _____

CHECKED BY: _____

DATE: _____

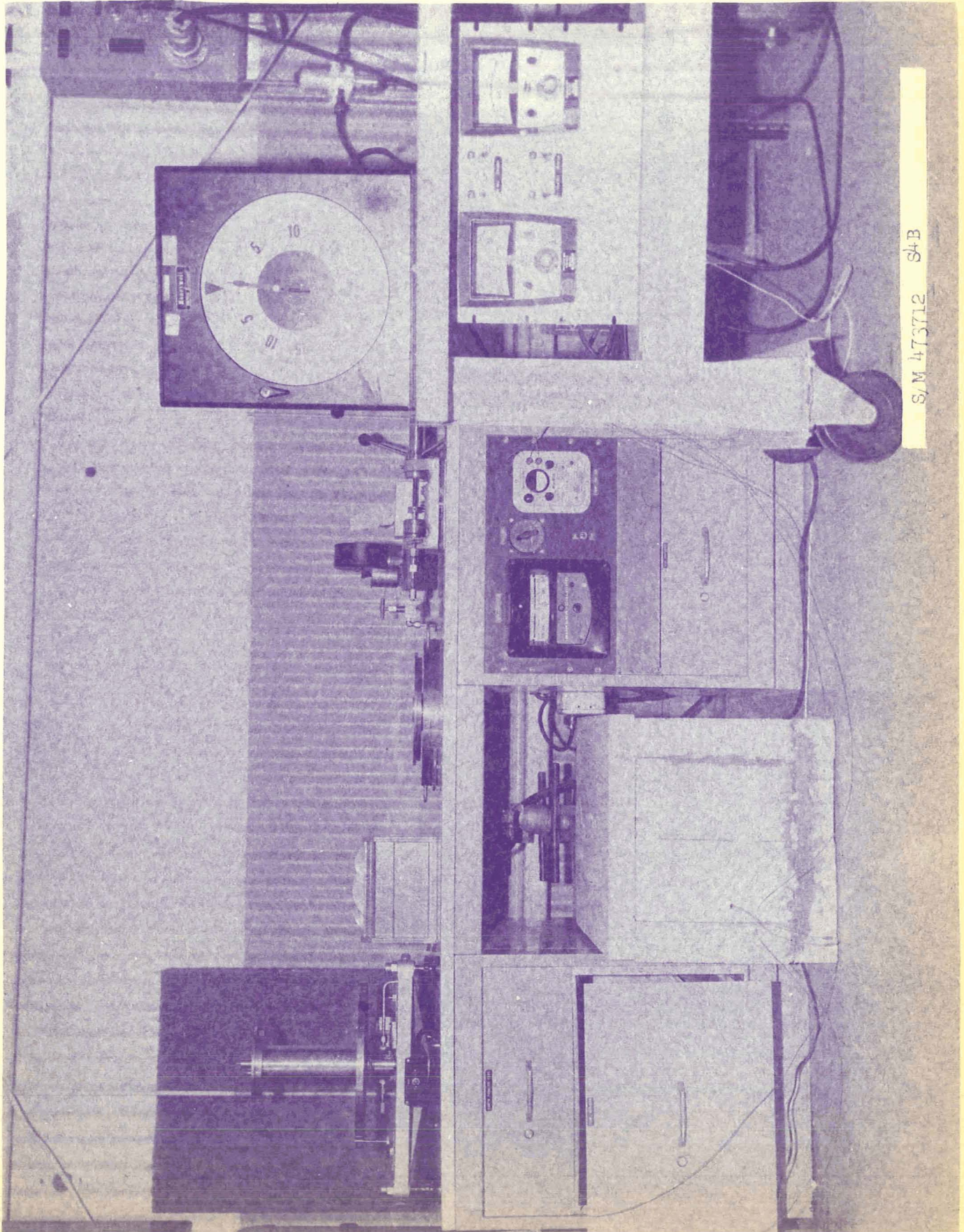
TITLE: HIGH TEMPERATURE SETUP

MISSILE & SPACE SYSTEMS DIVISION

PAGE: B-3

MODEL: DSV-4B

REPORT NO: TM-R-5222



DOUGLAS AIRCRAFT COMPANY, INC.

PREPARED BY: _____
CHECKED BY: _____
DATE: _____
TITLE: LOW TEMPERATURE SETUP

MISSILE & SPACE SYSTEMS DIVISION

PAGE: B-4
MODEL: DSV-4B
REPORT NO: TM-R-5222

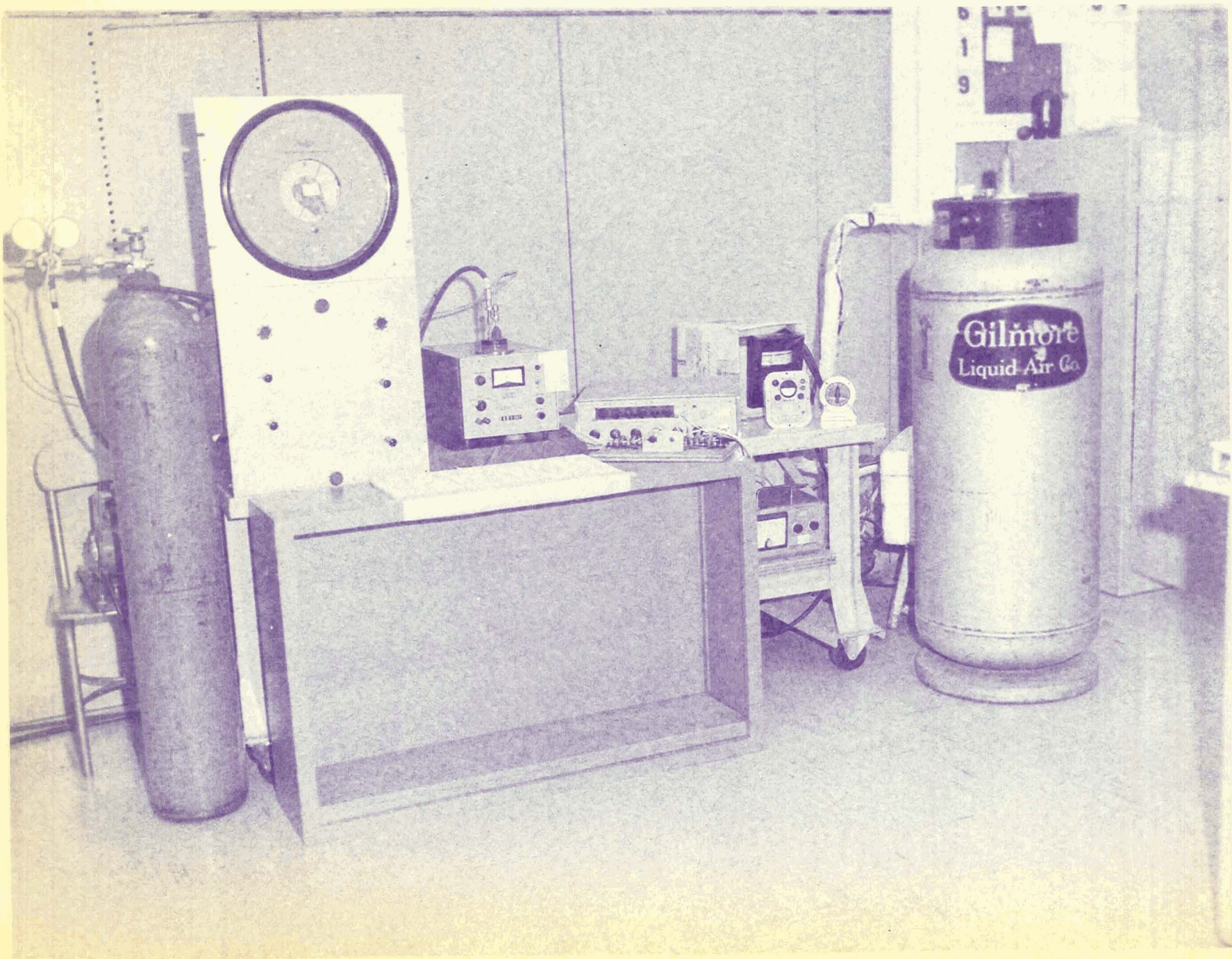


PHOTO SM 471310

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

TM-R-5222

FORM 30-830 (7-65)

DATE 7-21-66 PRE-ENVIRONMENTAL TEST PAGE C-1
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER R.P. McCOMMON LABORATORY A-297 EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

LEAKAGE

Chamber Pressure N/A Microns Leakage Rate $< 2 \times 10^{-9}$ scc/sec Duration N/A sec.

INSULATION RESISTANCE

Connector J1 between:

Case to pins AD shorted 40K Megohms
Case to pins BC shorted 35K Megohms

Connector J2 between:

Case to pins ABDE shorted 3.7K Megohms

ISOLATION RESISTANCE

Connector J1 between:

Pins AD shorted to pin
BC shorted 18K Megohms

CONTINUITY CHECK

Connector J2 between:

Pin C and case 0 Ohms

HEATER INPUT POWER

After 1 second of applies power

Temp. Monitor 51.8 MV
Input Voltage 28.0 VDC
Input Current 860 MA

After 5 minutes of applied power

Temp. Monitor 66.4 MV
Input Voltage 28.0 VDC
Input Current 835 MA

AMPLIFIER INPUT POWER

With 50K ohm load

Input Voltage 28.0 VDC
Input Current 32.0 MA

Shorted Load

28.0 VDC
32.0 MA

Open Ckt Load

28.0 VDC
32.0 MA

REVERSE POLARITY

Input Voltage 28.0 VDC
Input Current 12.0 MA

28.0 VDC
12.0 MA

28.0 VDC
12.0 MA

COMMENTS:

NOTE: HEATER INPUT POWER
AFTER 1 HOUR OF APPLIED POWER
TEMP. MONITOR 95.2 MV
INPUT VOLTAGE 28.0 VDC
INPUT CURRENT 175 MA.

DATE 7/21/66 TITLE PRE ENVIRONMENTAL
 BARMETRIC PRESSURE LINE ITEM AA67
 OUTPUT LOAD S.J. 5779-6105
 OBSERVER MC COMMAN ENGINEER BERING

P/N 1832293-515 S/N 160
 E.W.O. 27980 T.C.D. 1T07858
 MODEL NO. DSV-4B

REPEATABILITY

FULL SCALE = 4.810200 MAXIMUM REPEATABILITY = .002000
 PER CENT = .041578

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.142800	.141900	.141900	.000900
2	10.00	40.00	.622200	.621900	.621900	.000300
3	20.00	80.00	1.105100	1.105000	1.105200	.000200
4	30.00	120.00	1.584700	1.584300	1.584600	.000400
5	40.00	160.00	2.063600	2.063500	2.063600	.000100
6	50.00	200.00	2.547400	2.546900	2.547800	.000900
7	60.00	240.00	3.033000	3.032700	3.033100	.000400
8	70.00	280.00	3.512100	3.511900	3.511800	.000300
9	80.00	320.00	3.990700	3.990800	3.990500	.000300
10	90.00	360.00	4.473500	4.473700	4.473100	.000600
11	100.00	400.00	4.953000	4.953500	4.951500	.002000
12	90.00	360.00	4.468600	4.469600	4.467600	.002000
13	80.00	320.00	3.985000	3.985500	3.984100	.001400
14	70.00	280.00	3.503100	3.503500	3.504100	.001400
15	60.00	240.00	3.026100	3.026600	3.025100	.001500
16	50.00	200.00	2.541400	2.541100	2.539800	.001600
17	40.00	160.00	2.057900	2.058000	2.056900	.001100
18	30.00	120.00	1.579300	1.579600	1.578200	.001400
19	20.00	80.00	1.102000	1.100700	1.100300	.001700
20	10.00	40.00	.619000	.619000	.618100	.000900
21	.00	.00	.141900	.141900	.140800	.001100

7/21/66 PRE ENVIRONMENTAL

LINE ITEM AA67 P/N 1B32293-515 S/N 160

TRIAL A

TERMINAL LINEARITY

FULL SCALE = 4.810200 MAX. LINE DEV. = .4079999999E-02 MAX. HYS. DEV. = .700000E-02
PER CENT = .8481975799E-01 PER CENT = .145624E 00

SLOPE = .4810200000002E-01
INTERCEPT = .1428000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.14280	.14280	.000000	.14190	.00090
2	10.00000	.62220	.62382	-.001620	.61900	.00320
3	20.00000	1.10310	1.10484	.000260	1.10200	.00310
4	30.00000	1.58470	1.58686	-.001160	1.57930	.00540
5	40.00000	2.06360	2.06688	-.003280	2.05790	.00570
6	50.00000	2.54740	2.54790	-.000500	2.54140	.00600
7	60.00000	3.03300	3.02892	.004080	3.02610	.00690
8	70.00000	3.51210	3.50994	.002160	3.50510	.00700
9	80.00000	3.99070	3.99096	-.000260	3.98500	.00570
10	90.00000	4.47350	4.47198	.001520	4.46860	.00490
11	100.00000	4.95300	4.95300	.000000	4.95300	.00000

7/21/66 PRE ENVIRONMENTAL

TRIAL 8

LINE ITEM AA67 P/N 1B32293-515 S/N 160

TERMINAL LINEARITY

FULL SCALE = 4.810200 MAX. LINE DEV. = .3840000019E-02 MAX. HYS. DEV. = .640000E-02
 PER CENT = .7983036089E-01 PER CENT = .133051E 00

SLOPE = .4811599999999E-01
 INTERCEPT = .1419000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.14190	.14190	.000000	.14190	.00000
2	10.00000	.62190	.62306	-.001160	.61900	.00290
3	20.00000	1.10500	1.10422	.000780	1.10070	.00430
4	30.00000	1.58430	1.58538	-.001080	1.57960	.00470
5	40.00000	2.06350	2.06654	-.003040	2.05800	.00550
6	50.00000	2.54690	2.54770	-.000800	2.54110	.00580
7	60.00000	3.03270	3.02886	.003840	3.02660	.00610
8	70.00000	3.51190	3.51002	.001880	3.50550	.00640
9	80.00000	3.99080	3.99118	-.000380	3.98550	.00530
10	90.00000	4.47370	4.47234	.001360	4.46960	.00410
11	100.00000	4.95350	4.95350	.000000	4.95350	.00000

7/21/66 PRE ENVIRONMENTAL

TRIAL C

LINE ITEM AA67 P/V 1832293-515 S/N 160

TERMINAL LINEARITY

FULL SCALE = 4.810200 MAX. LINE DEV. = .5440000023E-02 MAX. HYS. DEV. = .8000000E-02
PER CENT = .1130930112E 00 PER CENT = .166313E 00

SLOPE = .4809600000000E+01
INTERCEPT = .1413000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.14190	.14190	.000000	.14080	.00110
2	10.00000	.62190	.62286	-.000960	.61810	.00380
3	20.00000	1.10320	1.10382	.001380	1.10030	.00490
4	30.00000	1.58460	1.58478	-.000180	1.57820	.00640
5	40.00000	2.06360	2.06574	-.002140	2.05690	.00670
6	50.00000	2.54780	2.54670	.001100	2.53980	.00800
7	60.00000	3.03310	3.02766	.005440	3.02510	.00800
8	70.00000	3.51180	3.50862	.003180	3.50410	.00770
9	80.00000	3.99050	3.98958	.000920	3.98410	.00640
10	90.00000	4.47310	4.47054	.002560	4.46760	.00550
11	100.00000	4.95150	4.95150	.000000	4.95150	.00000



MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

DATA SHEET

FORM 30-830 (7-65)

TM-R-5222

DATE 7-21-66 PRE-ENVIRONMENTAL TEST PAGE C-6
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER Mc Common LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

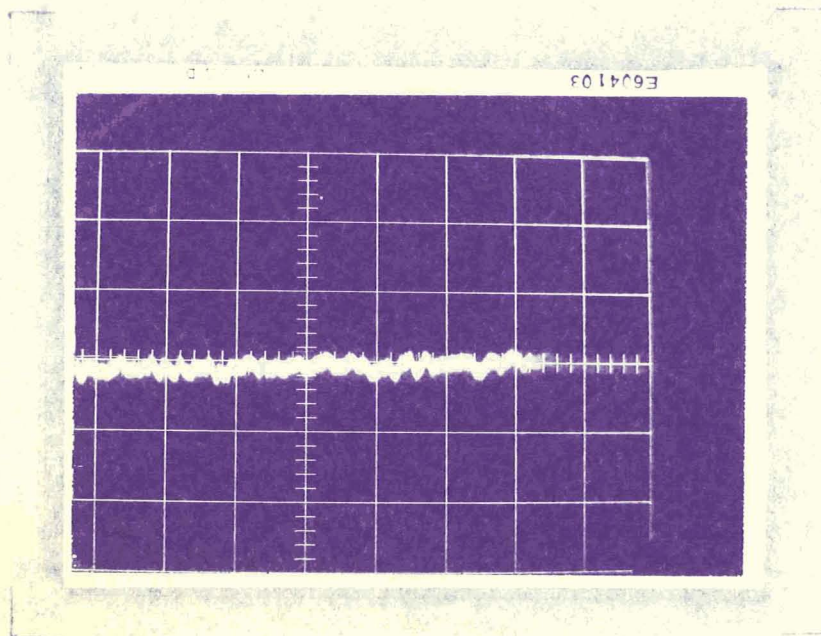
S/N 160

REGULATION: POWER INPUT	$28 \pm .10$	$25.2 \pm .10$	$30.8 \pm .10$	MAX CHANGE (VDC)
	$28 \pm .28$	$24 \pm .24$	$32 \pm .30$	
OUTPUT (vdc)	<u>4.9521</u>	<u>4.9508</u>	<u>4.9528</u>	<u>-0.0013</u>
%Δ	<u>0</u>	<u>-0.026%</u>	<u>0.014%</u>	<u>-0.026%</u>

RIPPLE:

INPUT VOLTAGE 28.00 VDC
INPUT PRESSURE 200 PSIA

OUTPUT VOLTAGE 2.5574 VDC
RIPPLE (PEAK TO PEAK) 0.2 MV



OSCILLOSCOPE

Sensitivity 5004 V/DIV.

Sweep Time 5 MS/DIV

COMMENTS:



MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

DATA SHEET

TM-R-5222

FORM 30-830 (7-66)

DATE 7-23-66 PRE ENVIRONMENTAL TEST PAGE C-7
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

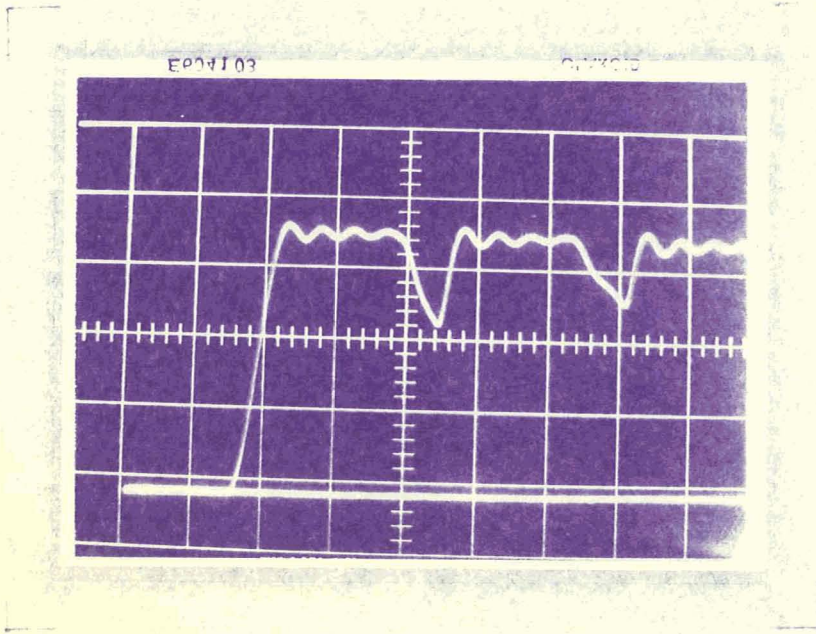
OBSERVER Mc COMMON LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67 P/N 1B32293-515 S/N 160

AMPLIFIER OUT IMPEDANCE

Input Voltage	<u>28.00</u> VDC
Input Pressure	<u>400</u> PSIA
No Load Output	<u>4.9823</u> VDC
90% No Load Output	<u>4.4941</u> VDC
Resistance for 90% Load	<u>2700</u> OHMS
Output Impedance	<u>300</u> OHMS

AMPLIFIER FREQUENCY RESPONSE



Oscilloscope

Sensitivity 1 V/DIV
Sweep Time 5 MS/DIV
Over Shoot 4.4 %
Time Period "T" 2.2 MS
Trans.Freq. =F= 454 CPS
Damping Ratio 0.705 h
Natural Freq.=F_N 648 CPS
Freq Response=FR 259 CPS

COMMENTS:

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

FORM 30-830 (7-65)

TM-R-5222

DATE 7-22-66 PRE-ENVIRONMENTAL TEST PAGE C-8
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER R.P. Mc COMMON LABORATORY A-297-EE/G&C ENGINEER C BERING

GTP: AA67

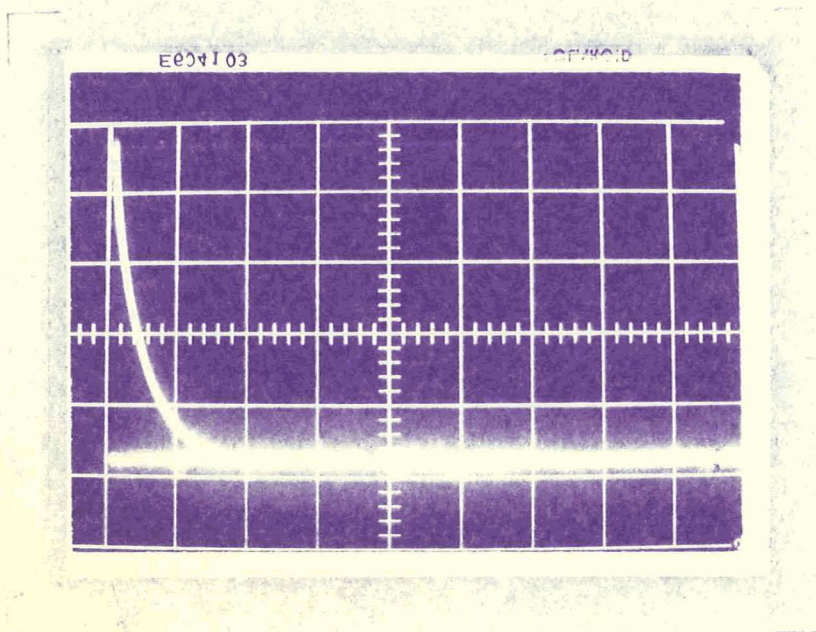
P/N 1B32293-515

S/N 160

AMPLIFIER OUT IMPEDANCE

Input Voltage	<u>28.00</u> VDC
Input Pressure	<u>400</u> PSIA
No Load Output	<u>4.9823</u> VDC
90% No Load Output	<u>4.424</u> VDC
Resistance for 90% Load	<u>2700</u> OHMS
Output Impedance	<u>300</u> OHMS

AMPLIFIER FREQUENCY RESPONSE



Oscilloscope

Sensitivity 1 V/DIV
Sweep Time 5 MS/DIV
Over Shoot 2 %
Time Period "T" — MS
Trans.Freq. =F= — CPS
Damping Ratio 0.780
Natural Freq.=F_N — CPS
Freq Response=FR — CPS

COMMENTS:

DATA SHEET

FORM 37-113-6
(REV 8-62)

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

TM-R-5222

DATE 7-25-66 HIGH TEMPERATURE TEST PAGE C-9
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER _____ LABORATORY A-297-EE/G&C ENGINEER _____

GTP: AA67

P/N 1B32293-515

S/N 160

TEMPERATURE, 125°F

INPUT PRESSURE 400 PSIA INPUT VOLTAGE 28.0 VDC

PRIOR TO HEATER POWER TEMP. MONITOR OUTPUT 78.0 MVDC

AFTER 1 MINUTE OF APPLIED HEATER POWER TEMP. MONITOR OUTPUT 78.0 MVDC

HEATER VOLTAGE N/A VDC

TIME HOURS	ELAPSED TIME AT TEMPERATURE				T-C °F	P-P MW OUTPUT RIPPLE
	OUTPUT VOLTS DC	PRESS. PSIA	TEMP MONITOR MV	°F		
0	5.1163	400 PSIG	78.0	126	125	3
2	5.1110	400 PSIG	96.9	127	127	2
4	5.1125	400 PSIG	96.6	127	127	2
6	5.1117	400 PSIG	96.4	125	125	.5
8	5.1064	400 PSIG	96.4	125	125	1
10	5.1059	400 PSIG	96.3	125	125	1
12	4.9287	400 PSIA	96.3	125	125	1

COMMENTS: PRESSURE FROM 0-10 HOURS WAS IN GAUGE PRESSURE NOT IN ABSOLUTE PRESSURE. THAT IS WHY THE OUTPUT VOLTAGE IS HIGHER FOR THESE PRESSURES AND ARE OUT OF SPECIFICATION.

DATE 7/25/66 TITLE HIGH TEMPERATURE +125 DEG F
 BAROMETRIC PRESSURE 30.15 LINE ITEM AA67
 OUTPUT LOAD 50K S.N. 5759-6105
 OBSERVER BOYLES ENGINEER MADISON

P/N 1832293-515
 E.W.O. 27980
 MODEL N3, DSV-48

S/N 160
 T.C.D. 1T07858

REPEATABILITY

FULL SCALE = 4.811300 MAXIMUM REPEATABILITY = .001700
 PER CENT = .035333

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.123000	.123400	.123100	.000400
2	10.00	40.00	.604400	.604600	.605000	.000600
3	20.00	80.00	1.085500	1.086900	1.087200	.001700
4	30.00	120.00	1.566700	1.567500	1.567800	.001100
5	40.00	160.00	2.047000	2.048200	2.048200	.001200
6	50.00	200.00	2.529200	2.529200	2.529500	.000600
7	60.00	240.00	3.012600	3.014300	3.013900	.001700
8	70.00	280.00	3.493300	3.494000	3.492500	.001500
9	80.00	320.00	3.973700	3.974900	3.974300	.001200
10	90.00	360.00	4.454100	4.455200	4.455500	.001400
11	100.00	400.00	4.934300	4.935000	4.936000	.001700
12	90.00	360.00	4.450200	4.450100	4.450100	.000100
13	80.00	320.00	3.967900	3.967800	3.968200	.000400
14	70.00	280.00	3.486300	3.486800	3.486700	.000500
15	60.00	240.00	3.005600	3.005900	3.006100	.000500
16	50.00	200.00	2.521900	2.522600	2.523000	.001100
17	40.00	160.00	2.041100	2.040700	2.041700	.001000
18	30.00	120.00	1.561100	1.561400	1.561600	.000500
19	20.00	80.00	1.081700	1.082100	1.082100	.000400
20	10.00	40.00	.601200	.601400	.600900	.000500
21	.00	.00	.123400	.123100	.123900	.000800

7/25/66 HIGH TEMPERATURE +125 DEG F
LINE ITEM AA67 P/N 1B32293-515 S/N 160

TRIAL A

TERMINAL LINEARITY

FULL SCALE = 4.811300
MAX. LINE DEV. = .2820000023E-02 MAX. HYS. DEV. = .730000E+02
PER CENT = .5861201803E-01 PER CENT = .131726E 00

SLOPE = .481129999998E+01
INTERCEPT = .123000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12300	.12300	.000000	.12340	-.00040
2	10.00000	.60440	.60413	.000270	.60120	.00320
3	20.00000	1.08550	1.08526	.000240	1.08170	.00380
4	30.00000	1.56670	1.56639	.000310	1.56110	.00560
5	40.00000	2.04700	2.04752	-.000520	2.04110	.00590
6	50.00000	2.52920	2.52865	.000550	2.52190	.00730
7	60.00000	3.01260	3.00978	.002820	3.00560	.00700
8	70.00000	3.49330	3.49091	.002390	3.48630	.00700
9	80.00000	3.97370	3.97204	.001660	3.96790	.00580
10	90.00000	4.45410	4.45317	.000930	4.45020	.00390
11	100.00000	4.93430	4.93430	.000000	4.93430	.00000

7/25/66 HIGH TEMPERATURE +125 DEG F
LINE ITEM AA67 P/N 1832293-615 S/N 160

TRIAL B

TERMINAL LINEARITY

FULL SCALE = 4.811300 MAX. LINE DEV. = .3940000010E-02 MAX. HYS. DEV. = .8400000E-02
PER CENT = .8189054953E-01 PER CENT = .174589E 00

SLOPE = .4811599999999E-01
INTERCEPT = .1234000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12340	.12340	.000000	.12310	.00030
2	10.00000	.60460	.60456	.000040	.60140	.00320
3	20.00000	1.08690	1.08572	.001180	1.08210	.00480
4	30.00000	1.56760	1.56688	.000720	1.56140	.00620
5	40.00000	2.04820	2.04804	.000160	2.04070	.00750
6	50.00000	2.52980	2.52920	.000600	2.52260	.00720
7	60.00000	3.01140	3.01036	.003940	3.00590	.00840
8	70.00000	3.49400	3.49152	.002480	3.48680	.00720
9	80.00000	3.97490	3.97268	.002220	3.96780	.00710
10	90.00000	4.45520	4.45384	.001360	4.45010	.00510
11	100.00000	4.93500	4.93500	.000000	4.93500	.00000

7/25/66 HIGH TEMPERATURE +125 DEG F
 LINE ITEM AA67 P/N 1532293-515 S/N 160

TRIAL C

TERMINAL LINEARITY

FULL SCALE = 4.811300 MAX. LINE DEV. = .3060000032E-02 MAX. HYS. DEV. = .780000E-02
 PER CENT = .6360027502E-01 PER CENT = .162118E 00

SLOPE = .481289999998E-01
 INTERCEPT = .123100000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12310	.12310	.000000	.12390	-.00080
2	10.00000	.60500	.60439	.000610	.60090	.00410
3	20.00000	1.08720	1.08568	.001520	1.08210	.00510
4	30.00000	1.56780	1.56697	.000830	1.56160	.00620
5	40.00000	2.04820	2.04826	-.000060	2.04170	.00650
6	50.00000	2.52950	2.52955	-.000050	2.52300	.00650
7	60.00000	3.01390	3.01084	.003060	3.00610	.00780
8	70.00000	3.49250	3.49213	.000370	3.48670	.00580
9	80.00000	3.97430	3.97342	.000880	3.96820	.00610
10	90.00000	4.45550	4.45471	.000790	4.45010	.00540
11	100.00000	4.93600	4.93600	.000000	4.93600	.00000

TOTAL ERROR BAND (TYPE 0, TEST NO. 2)

DATE 7/25/66 TITLE HIGH TEMPERATURE +125 DEG F
 BAROMETRIC PRESSURE 30.15 LINE ITEM AA67 P/N 1832293-515 S/N 150
 OUTPUT LOAD 50K C.O. 5763-6105 E.W.O. 27980 T.C.O. 1T07858
 OBSERVER BYLES ENGINEER MADISON MODEL NO. OSV-43

	PERCENT FULL SCALE	REFERENCE CALIB	MAXIMUM ERROR PT	ACTUAL DEVIATION	PERCENT DEVIATION
1	.000000	.141867	.123000	-.018867	-.392173
2	10.000000	.620350	.604900	-.015950	-.331546
3	20.000000	1.103050	1.086500	-.017550	-.364804
4	30.000000	1.581753	1.566700	-.015053	-.313531
5	40.000000	2.060553	2.047000	-.013553	-.282351
6	50.000000	2.544067	2.529200	-.014867	-.309027
7	60.000000	3.029433	3.012600	-.016833	-.349907
8	70.000000	3.508417	3.492300	-.016917	-.330853
9	80.000000	3.987767	3.973700	-.014067	-.292398
10	90.000000	4.471017	4.454100	-.016917	-.331639
11	100.000000	4.952557	4.934300	-.018257	-.381780
12	90.000000	4.471017	4.450100	-.020917	-.434756
13	80.000000	3.987767	3.967800	-.019967	-.415038
14	70.000000	3.508417	3.486300	-.022117	-.459729
15	60.000000	3.029433	3.005600	-.023833	-.495413
16	50.000000	2.544067	2.521900	-.022167	-.460759
17	40.000000	2.060553	2.040700	-.019853	-.413306
18	30.000000	1.581753	1.561100	-.020653	-.429935
19	20.000000	1.103050	1.081700	-.021350	-.443793
20	10.000000	.620350	.600900	-.019450	-.404239
21	.000000	.141867	.123100	-.018767	-.390095

FULL SCALE = 4.81080 MAX DEVIATION(ACT) = -.02363 MAX DEVIATION(PERCENT) = -.49541

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

TM-R-5222

FORM 30-830 (7-65)

DATE 7-26-66 POST HIGH TEMPERATURE TEST PAGE C-15
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297 EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

LEAKAGE

Chamber Pressure N/A Microns Leakage Rate N/A scc/sec Duration N/A sec.

INSULATION RESISTANCE

Connector J1 between:

Case to pins AD shorted 27K Megohms
Case to pins BC shorted 27K Megohms

Connector J2 between:

Case to pins ABDE shorted 350 Megohms

ISOLATION RESISTANCE

Connector J1 between:

Pins AD shorted to pin
BC shorted 15K Megohms

CONTINUITY CHECK

Connector J2 between:

Pin C and case 0 Ohms

HEATER INPUT POWER

After 1 second of applies power

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

After 5 minutes of applied power

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

AMPLIFIER INPUT POWER

With 50K ohm load

Input Voltage N/A VDC
Input Current N/A MA

Shorted Load

N/A VDC
N/A MA

Open Ckt Load

N/A VDC
N/A MA

REVERSE POLARITY

Input Voltage N/A VDC
Input Current N/A MA

N/A VDC
N/A MA

N/A VDC
N/A MA

COMMENTS:

DOUGLAS

MISSILE & SPACE SYSTEMS DIVISION

DOUGLAS AIRCRAFT COMPANY, INC.

DATA SHEET

FORM 30-830 (7-65)

TM-R-5222

DATE 7-26-66 POST HIGH TEMPERATURE TEST PAGE C-16
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A. C. RICHARDS LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67 P/N 1B32293-515 S/N 160

REGULATION: POWER INPUT	<u>28 ± .10</u>	<u>25.2 ± .10</u>	<u>30.8 ± .10</u>	MAX CHANGE	<u>25.2 ± 0.10</u>
OUTPUT (vdc)	<u>4.9318</u>	<u>4.9280</u>	<u>4.9303</u>		<u>-0.0038vdc</u>
%Δ	<u>0</u>	<u>-0.077</u>	<u>-0.030</u>		<u>-0.077%</u>

RIPPLE:

INPUT VOLTAGE	<u>N/A</u>	VDC	OUTPUT VOLTAGE	<u>N/A</u>	VDC
INPUT PRESSURE	<u>N/A</u>	PSIA	RIPPLE (PEAK TO PEAK)	<u>N/A</u>	MV

OSCILLOSCOPE

Sensitivity N/A V/DIV.

Sweep Time N/A MS/DIV

COMMENTS:

DATE 7/26/56 TITLE POST HIGH TEMPERATURE
 BAROMETRIC PRESSURE LINE ITEM AA67
 OUTPUT LOAD 100K S.O. 5779-6105
 OBSERVER AC RICHARDS ENGINEER C. BERING

P/N 1B32293-515 S/N 160
 E.W.D. 27980 T.C.D. 1T07858
 MODEL NO. DSV-4B

REPEATABILITY

FULL SCALE = 4.808500 MAXIMUM REPEATABILITY = .002500
 PER CENT = .051991

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.121100	.122700	.000000	.001600
2	10.00	40.00	.600100	.601500	.000000	.001400
3	20.00	80.00	1.081200	1.082500	.000000	.001300
4	30.00	120.00	1.562100	1.563600	.000000	.001500
5	40.00	160.00	2.042300	2.044200	.000000	.001900
6	50.00	200.00	2.524400	2.526200	.000000	.001800
7	60.00	240.00	3.008200	3.010200	.000000	.002000
8	70.00	280.00	3.488300	3.490800	.000000	.002500
9	80.00	320.00	3.968600	3.970800	.000000	.002200
10	90.00	360.00	4.449100	4.451400	.000000	.002300
11	100.00	400.00	4.929600	4.932000	.000000	.002400
12	90.00	360.00	4.445000	4.447400	.000000	.002400
13	80.00	320.00	3.968300	3.965000	.000000	.001700
14	70.00	280.00	3.482400	3.483800	.000000	.001400
15	60.00	240.00	3.002200	3.003700	.000000	.001500
16	50.00	200.00	2.518400	2.519800	.000000	.001400
17	40.00	160.00	2.037000	2.038300	.000000	.001300
18	30.00	120.00	1.557800	1.558600	.000000	.000800
19	20.00	80.00	1.078000	1.078700	.000000	.000700
20	10.00	40.00	.598400	.598000	.000000	.000400
21	.00	.00	.122700	.122300	.000000	.000400

7/26/66 POST HIGH TEMPERATURE

TRIAL A

LINE ITEM AA67 P/N 1B32293-515 S/N 160.

TERMINAL LINEARITY

FULL SCALE = 4.808500 MAX. LINE DEV. = .2199999988E-02 MAX. HYS. DEV. = .6000000E-02
 PER CENT = .4575231336E-01 PER CENT = .124779E-00

SLOPE = .4808500000001E-01
 INTERCEPT = .1211000000000E-00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12110	.12110	.000000	.12270	-.00160
2	10.00000	.60010	.60195	-.001850	.59840	.00170
3	20.00000	1.08120	1.08280	-.001600	1.07800	.00320
4	30.00000	1.56210	1.56365	-.001550	1.55780	.00430
5	40.00000	2.04230	2.04450	-.002200	2.03700	.00530
6	50.00000	2.52440	2.52535	-.000950	2.51840	.00600
7	60.00000	3.00820	3.00620	.002000	3.00220	.00600
8	70.00000	3.48830	3.48705	.001250	3.48240	.00590
9	80.00000	3.96860	3.96790	.000700	3.96330	.00530
10	90.00000	4.44910	4.44875	.000350	4.44500	.00410
11	100.00000	4.92960	4.92960	.000000	4.92960	.00000

7/26/66 PBST HIGH TEMPERATURE

TRIAL B

LINE ITEM AA67 P/N 1B32293-515 S/N 150

TERMINAL LINEARITY

FULL SCALE = 4.808500 MAX. LINE DEV. = .2219999995E-02 MAX. HYS. DEV. = .700000E-02
PER CENT = .4616824363E-01 PER CENT = .145576E 00

SLOPE = .4809300000001E-01
INTERCEPT = .1227000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12270	.12270	.000000	.12230	.00040
2	10.00000	.60150	.60363	-.002130	.59800	.00350
3	20.00000	1.08250	1.08456	-.002060	1.07870	.00380
4	30.00000	1.56350	1.56549	-.001890	1.55860	.00500
5	40.00000	2.04420	2.04642	-.002220	2.03830	.00590
6	50.00000	2.52620	2.52735	-.001150	2.51980	.00640
7	60.00000	3.01020	3.00828	.001920	3.00370	.00650
8	70.00000	3.49080	3.48921	.001590	3.48380	.00700
9	80.00000	3.97080	3.97014	.000660	3.96500	.00580
10	90.00000	4.45140	4.45107	.000330	4.44740	.00400
11	100.00000	4.93200	4.93200	.000000	4.93200	.00000

DATE 7-27-66 LOW TEMPERATURE TEST PAGE C-20
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

TEMPERATURE, 0°F

INPUT PRESSURE 400 PSIA INPUT VOLTAGE 28 VDC

PRIOR TO HEATER POWER TEMP. MONITOR OUTPUT — MVDC

AFTER 1 MINUTE OF APPLIED HEATER POWER TEMP. MONITOR OUTPUT — MVDC

HEATER VOLTAGE — VDC

TIME HOURS	ELAPSED TIME AT TEMPERATURE					P-P MV OUTPUT RIPPLE
	OUTPUT VOLTS DC	PRESS. PSIA	TEMP MONITOR MV	°F	T-C °F	
0	4.8796	400	21.5	—	—	2.0
2	4.9429	400	91.8	0°F	0°F	1.8
4	4.7748	400	14.3	—	—	2.0
6	4.9208	400	94.0	0°F	0°F	1.8
8	4.9194	400	93.9	0°F	0°F	.5
10	4.9191	400	93.7	0°F	0°F	.5
12	4.9184	400	92.6	0°F	0°F	.5

COMMENTS:

DATE 7-27-66 LOW TEMPERATURE TEST PAGE C-21
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-435-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A. C. RICHARDS LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

REGULATION: POWER INPUT 28 ± .10 25.2 ± .10 30.8 ± .10 MAX CHANGE 25.2 ± 0.10
AT 400 PSIA OUTPUT (vdc) 4.9240 4.9204 4.9238 -0.0036
%Δ -0.073% -0.004% -0.073%

RIPPLE:

INPUT VOLTAGE N/A VDC
INPUT PRESSURE N/A PSIA

OUTPUT VOLTAGE N/A VDC
RIPPLE (PEAK TO PEAK) N/A MV

OSCILLOSCOPE

Sensitivity N/A V/DIV.

Sweep Time N/A MS/DIV

COMMENTS:

DATE 7/27/66 TITLE LOW TEMPERATURE 0 DEG F
 BAROMETRIC PRESSURE LINE ITEM AA67
 OUTPUT LOAD 50K S.D. 5779-6105
 OBSERVER BILL BOYLES ENGINEER C. BERING

P/N 1B32293-515 S/N 160
 E.W.D. 27960 T.C.D. 1T07853
 MODEL NO. DSV-43

REPEATABILITY

FULL SCALE = 4.804400 MAXIMUM REPEATABILITY = .003100
 PER CENT = .06452%

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.123500	.124300	.000000	.000800
2	10.00	40.00	.501900	.502800	.000000	.000900
3	20.00	80.00	1.083300	1.084100	.000000	.000800
4	30.00	120.00	1.563200	1.564100	.000000	.000900
5	40.00	160.00	2.042400	2.043400	.000000	.001000
6	50.00	200.00	2.522400	2.523300	.000000	.000900
7	60.00	240.00	3.008600	3.009500	.000000	.000900
8	70.00	280.00	3.488000	3.487400	.000000	.000600
9	80.00	320.00	3.967400	3.964500	.000000	.002900
10	90.00	360.00	4.448000	4.445100	.000000	.002900
11	100.00	400.00	4.927900	4.926400	.000000	.001500
12	90.00	360.00	4.443700	4.442100	.000000	.001600
13	80.00	320.00	3.961400	3.960400	.000000	.001000
14	70.00	280.00	3.481100	3.480100	.000000	.001000
15	60.00	240.00	3.001600	3.004700	.000000	.003100
16	50.00	200.00	2.517500	2.519400	.000000	.001900
17	40.00	160.00	2.036800	2.037500	.000000	.000700
18	30.00	120.00	1.557200	1.558200	.000000	.001000
19	20.00	80.00	1.078200	1.076200	.000000	.002000
20	10.00	40.00	.599500	.596600	.000000	.002900
21	.00	.00	.124300	.123200	.000000	.001100

7/27/66 LOW TEMPERATURE 0 DEG F
LINE ITEM AA67 P/N 1332293-515 S/N 160

TRIAL A

TERMINAL LINEARITY

FULL SCALE = 4.804400 MAX. LINE DEV. = .2859999993E-02 MAX. HYS. DEV. = .700000E-02
PER CENT = .5952876516E-01 PER CENT = .145700E 00

SLOPE = .480440000001E+01
INTERCEPT = .123500000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12350	.12350	.000000	.12430	-.00080
2	10.00000	.60190	.60394	-.002040	.59950	.00240
3	20.00000	1.08330	1.08438	-.001080	1.07820	.00510
4	30.00000	1.56320	1.56482	-.001620	1.55720	.00600
5	40.00000	2.04240	2.04526	-.002860	2.03680	.00560
6	50.00000	2.52430	2.52570	-.001400	2.51750	.00680
7	60.00000	3.00860	3.00614	.002460	3.00160	.00700
8	70.00000	3.48800	3.48658	.001420	3.48110	.00690
9	80.00000	3.96740	3.96702	.000380	3.96140	.00600
10	90.00000	4.44800	4.44746	.000540	4.44370	.00430
11	100.00000	4.92790	4.92790	.000000	4.92790	.00000

7/27/66 LOW TEMPERATURE 0 DEG F
 LINE ITEM AA67 P/N 1832293-515 S/N 160

TRIAL 8

TERMINAL LINEARITY

FULL SCALE = 4.804400 MAX. LINE DEV. = .4340000029E-02 MAX. HYS. DEV. = .7900000E-02
 PER CENT = .9033386122E-01 PER CENT = .164433E 00

SLOPE = .480209999998E+01
 INTERCEPT = .124300000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12430	.12430	.000000	.12320	.00110
2	10.00000	.50280	.50451	-.001710	.59660	.00620
3	20.00000	1.08410	1.08472	-.000620	1.07620	.00790
4	30.00000	1.56410	1.56493	-.000830	1.55820	.00590
5	40.00000	2.04340	2.04514	-.001740	2.03750	.00590
6	50.00000	2.52630	2.52535	.000950	2.51940	.00690
7	60.00000	3.00990	3.00556	.004340	3.00470	.00520
8	70.00000	3.48740	3.48577	.001630	3.48010	.00730
9	80.00000	3.96450	3.96598	-.001480	3.96040	.00410
10	90.00000	4.44510	4.44619	-.001090	4.44210	.00300
11	100.00000	4.92640	4.92640	.000000	4.92640	.00000

TOTAL ERROR BAND (TYPE O, TEST NO. 40)

DATE 7/27/66 TITLE LBN TEMPERATURE C DEG F
 BAROMETRIC PRESSURE . LINE ITEM AA67 P/N 1832293-518 S/V 160
 OUTPUT 300 50K S.O. 5779-5105 E.W.D. 27930 T.C.D. 1T07853
 OBSERVER BILL BOYLES ENGINEER C. BERING MODEL NO. 05V-43

	PERCENT FULL SCALE	REFERENCE CALIB	MAXIMUM ERROR PT	ACTUAL DEVIATION	PERCENT DEVIATION
1	.000000	.141867	.123300	-.018367	-.381750
2	10.000000	.620350	.501900	-.018450	-.383512
3	20.000000	1.103090	1.083300	-.019750	-.410535
4	30.000000	1.581783	1.563200	-.018583	-.386284
5	40.000000	2.060583	2.042400	-.018183	-.377969
6	50.000000	2.544067	2.524300	-.019767	-.410881
7	60.000000	3.029433	3.008600	-.020833	-.433053
8	70.000000	3.508417	3.487400	-.021017	-.435864
9	80.000000	3.987767	3.964500	-.023267	-.483634
10	90.000000	4.471017	4.445100	-.025917	-.538718
11	100.000000	4.952667	4.925400	-.025267	-.545994
12	90.000000	4.471017	4.442100	-.028917	-.601078
13	80.000000	3.987767	3.960400	-.027367	-.568859
14	70.000000	3.508417	3.483100	-.023317	-.588605
15	60.000000	3.029433	3.001600	-.027833	-.578559
16	50.000000	2.544067	2.517500	-.026567	-.552230
17	40.000000	2.060583	2.036300	-.023783	-.494374
18	30.000000	1.581783	1.557200	-.024583	-.511003
19	20.000000	1.103090	1.076200	-.026850	-.558119
20	10.000000	.620350	.596600	-.023750	-.495681
21	.000000	.141867	.123200	-.018667	-.388016

FULL SCALE = 4.81080 MAX DEVIATION(FACT) = -.02892 MAX DEVIATION(PERCENT) = -.60108

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

TM-R-5222

FORM 30-830 (7-65)

C-26

DATE 7-27-66 LOW TEMPERATURE TEST
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the LOW TEMP. TEST ON LINE ITEM
AA67
OBSERVER A.C. RICHARDS LABORATORY A-297-EE/G&C ENGINEER C. BEIRING

GTP: AA67

P/N 1B32293-515

S/N 160

AMPLIFIER OUT IMPEDANCE

Input Voltage	<u>28.00</u> VDC
Input Pressure	<u>400</u> PSIA
No Load Output	<u>50×10^{-3}</u> VDC
90% No Load Output	<u>45×10^{-3}</u> VDC
Resistance for 90% Load	<u>1400</u> OHMS
Output Impedance	<u>155</u> OHMS

AMPLIFIER FREQUENCY RESPONSE

Oscilloscope

Sensitivity	<u>N/A</u> V/DIV
Sweep Time	<u>N/A</u> MS/DIV
Over Shoot	<u>N/A</u> %
Time Period "T"	<u>N/A</u> MS
Trans.Freq. =F	<u>N/A</u> CPS
Damping Ratio	<u>N/A</u> h
Natural Freq.=F _N	<u>N/A</u> CPS
Freq Response=F _R	<u>N/A</u> CPS

COMMENTS:

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

TM-R-5222

FORM 30-830 (7-65)

DATE 7-28-66 POST LOW TEMPERATURE TEST PAGE C-27
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297 EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293- 515 S/N 160

LEAKAGE

Chamber Pressure N/A Microns Leakage Rate N/A scc/sec Duration N/A sec.

INSULATION RESISTANCE

Connector J1 between:

Case to pins AD shorted 70K Megohms
Case to pins BC shorted 80K Megohms

Connector J2 between:

Case to pins ABDE shorted 140 Megohms

ISOLATION RESISTANCE

Connector J1 between:

Pins AD shorted to pin
BC shorted 16K Megohms

CONTINUITY CHECK

Connector J2 between:

Pin C and case 0 Ohms

HEATER INPUT POWER

After 1 second of applies power

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

After 5 minutes of applied power

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

AMPLIFIER INPUT POWER

With 50K ohm load

Input Voltage N/A VDC
Input Current N/A MA

Shorted Load

N/A VDC
N/A MA

Open Ckt Load

N/A VDC
N/A MA

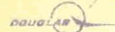
REVERSE POLARITY

Input Voltage N/A VDC
Input Current N/A MA

N/A VDC
N/A MA

N/A VDC
N/A MA

COMMENTS:



MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

DATA SHEET

FORM 30-830 (7-65)

TM-R-5222

DATE 7-28-66 POST LOW TEMPERATURE TEST PAGE C-28
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C.R. LABORATORY A-297-EE/G&C ENGINEER C.BERING

GTP: AA67

P/N 1B32293-515

S/N 160

REGULATION: POWER INPUT	<u>28 ± .10</u>	<u>25.2 ± .10</u>	<u>30.8 ± .10</u>	MAX CHANGE	<u>30.8</u>
OUTPUT (vdc)	<u>4.8958</u>	<u>4.8946</u>	<u>4.8945</u>		<u>0.0013</u>
%Δ	<u>-0.02</u>	<u>-0.026</u>			<u>-0.026%</u>

RIPPLE:

INPUT VOLTAGE N/A VDC
INPUT PRESSURE N/A PSIA

OUTPUT VOLTAGE N/A VDC
RIPPLE (PEAK TO PEAK) N/A MV

OSCILLOSCOPE

Sensitivity N/A V/DIV.

Sweep Time N/A MS/DIV

COMMENTS:

DATE 7/28/66 TITLE PIST LOW TEMPERATURE
 BAROMETRIC PRESSURE . LINE ITEM AA57
 OUTPUT LOAD 50K 3.0 5779-6105
 OBSERVER RICHARDS ENGINEER BERING

P/N 1A32293-015 S/N 160
 E.W.D. 27980 T.C.D. 1T07858
 MODEL V3. OSV-4B

REPEATABILITY

FULL SCALE = 4.803100 MAXIMUM REPEATABILITY = .002100
 PER CENT = .043722

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.121900	.119800	.000000	.002100
2	10.00	40.00	.599800	.598500	.000000	.001300
3	20.00	80.00	1.080900	1.080600	.000000	.000300
4	30.00	120.00	1.561000	1.560900	.000000	.000100
5	40.00	160.00	2.040200	2.040200	.000000	.000000
6	50.00	200.00	2.521800	2.521300	.000000	.000500
7	60.00	240.00	3.005500	3.005700	.000000	.000200
8	70.00	280.00	3.485200	3.485300	.000000	.000100
9	80.00	320.00	3.964100	3.964900	.000000	.000800
10	90.00	360.00	4.444700	4.445500	.000000	.000800
11	100.00	400.00	4.925000	4.926000	.000000	.001000
12	90.00	360.00	4.440700	4.441400	.000000	.000700
13	80.00	320.00	3.959100	3.959900	.000000	.000800
14	70.00	280.00	3.478900	3.479500	.000000	.000700
15	60.00	240.00	2.999200	2.999700	.000000	.000500
16	50.00	200.00	2.515200	2.515500	.000000	.000300
17	40.00	160.00	2.033800	2.034000	.000000	.000200
18	30.00	120.00	1.554900	1.555200	.000000	.000300
19	20.00	80.00	1.076100	1.076200	.000000	.000100
20	10.00	40.00	.595800	.595500	.000000	.000300
21	.00	.00	.119800	.119200	.000000	.000600

7/28/66 POST LOW TEMPERATURE
 LINE ITEM AA67 P/N 1B32293-515 S/N 160

TRIAL A

TERMINAL LINEARITY

FULL SCALE = 4.803100
 MAX. LINE DEV. = .2939999977E-02 MAX. HYS. DEV. = .6600000E-02
 PER CENT = .6121046775E-01 PER CENT = .137411E 00
 SLOPE = .4803099999998E-01
 INTERCEPT = .1219000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.000000	.12190	.12190	.000000	.11980	.00210
2	10.00000	.59980	.60221	-.002410	.59580	.00400
3	20.00000	1.08090	1.08252	-.001620	1.07610	.00480
4	30.00000	1.56100	1.56283	-.001830	1.55490	.00610
5	40.00000	2.04020	2.04314	-.002940	2.03380	.00640
6	50.00000	2.52180	2.52345	-.001650	2.51520	.00660
7	60.00000	3.00350	3.00375	.001740	2.99920	.00630
8	70.00000	3.48520	3.48407	.001130	3.47890	.00630
9	80.00000	3.96410	3.96438	-.000280	3.95910	.00500
10	90.00000	4.44470	4.44469	.000010	4.44070	.00400
11	100.00000	4.92500	4.92500	.000000	4.92500	.00000

7/28/66 POST LOW TEMPERATURE
 LINE ITEM 4467 P/N 1832293-515 S/N 160

TRIAL B

TERMINAL LINEARITY

FULL SCALE = 4.803100 MAX. LINE DEV. = .21800000010E-02 MAX. HYS. DEV. = .6200000E-02
 PER CENT = .4538735422E-01 PER CENT = .129083E 00

SLOPE = .4806200000001E-01
 INTERCEPT = .1198000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.11980	.11980	.000000	.11920	.00060
2	10.00000	.59850	.60042	-.001920	.59550	.00300
3	20.00000	1.08060	1.08104	-.000440	1.07620	.00440
4	30.00000	1.56090	1.56166	-.000760	1.55520	.00570
5	40.00000	2.04020	2.04228	-.002080	2.03400	.00620
6	50.00000	2.52130	2.52290	-.001600	2.51550	.00580
7	60.00000	3.00570	3.00352	.002180	2.99970	.00600
8	70.00000	3.48530	3.48414	.001160	3.47960	.00570
9	80.00000	3.96490	3.96476	.000140	3.95990	.00500
10	90.00000	4.44550	4.44538	.000120	4.44140	.00410
11	100.00000	4.92600	4.92600	.000000	4.92600	.00000

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

TM-R-5222

FORM 30-830 (7-65)

DATE 8-5-66 PRE - EMI TEST PAGE C-32
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-0105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

REGULATION: POWER INPUT	<u>28 ± .10</u>	<u>25.2 ± .10</u>	<u>30.8 ± .10</u>	MAX CHANGE	<u>25.2 VDC</u>
OUTPUT (vdc)	<u>4.9264</u>	<u>4.9244</u>	<u>4.9269</u>		<u>0.002 VDC</u>
%Δ	<u>0</u>	<u>0.04</u>	<u>0.01</u>		<u>0.04%</u>

RIPPLE:

INPUT VOLTAGE N/A VDC
INPUT PRESSURE N/A PSIA

OUTPUT VOLTAGE N/A VDC
RIPPLE (PEAK TO PEAK) N/A MV

OSCILLOSCOPE

Sensitivity N/A V/DIV.

Sweep Time N/A MS/DIV

COMMENTS:

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

FORM 30-830 (7-65)

TM-R-5222

DATE 8-5-66 PRE EMI TEST PAGE C-33
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297 EE/Q&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293- 515 S/N 160

LEAKAGE

Chamber Pressure N/A Microns Leakage Rate N/A scc/sec Duration N/A sec.

INSULATION RESISTANCE

Connector J1 between:

Case to pins AD shorted 24.K Megohms
Case to pins BC shorted 24.K Megohms

Connector J2 between:

Case to pins ABDE shorted 210 Megohms

ISOLATION RESISTANCE

Connector J1 between:

Pins AD shorted to pin
BC shorted 8.0K Megohms

CONTINUITY CHECK

Connector J2 between:

Pin C and case <.1 Ohms

HEATER INPUT POWER

After 1 second of applies power

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

After 5 minutes of applied power

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

AMPLIFIER INPUT POWER

With 50K ohm load

Input Voltage N/A VDC
Input Current N/A MA

Shorted Load

N/A VDC
N/A MA

Open Ckt Load

N/A VDC
N/A MA

REVERSE POLARITY

Input Voltage N/A VDC
Input Current N/A MA

N/A VDC
N/A MA

N/A VDC
N/A MA

COMMENTS:

DATE 8/05/66 TITLE PRE EMI

BAROMETRIC PRESSURE *

OUTPUT LOAD 50K

OBSERVER MCCOMMON

LINE ITEM 4A67

S.S. 5779-6105

ENGINEER BERING

P/N 1332293-515

E.A.O. 27980

MODEL 43. 057-4B

S/N 160

T.C.D. 1107858

REPEATABILITY

FULL SCALE = 4.797000 MAXIMUM REPEATABILITY = .004900
PER CENT = .102147

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.130600	.126900	.125700	.004900
2	10.00	40.00	.607400	.604800	.603900	.003500
3	20.00	80.00	1.086200	1.084600	1.083800	.002400
4	30.00	120.00	1.565800	1.564300	1.563800	.002000
5	40.00	160.00	2.046600	2.044800	2.044300	.002300
6	50.00	200.00	2.527500	2.526400	2.526400	.001100
7	60.00	240.00	3.008700	3.008100	3.007500	.001200
8	70.00	280.00	3.488700	3.488500	3.488400	.000300
9	80.00	320.00	3.969700	3.968900	3.969700	.000800
10	90.00	360.00	4.449400	4.449700	4.449600	.000300
11	100.00	400.00	4.927600	4.927300	4.927700	.000400
12	90.00	360.00	4.445500	4.444300	4.445400	.001200
13	80.00	320.00	3.963600	3.963600	3.963700	.000100
14	70.00	280.00	3.481800	3.481900	3.480800	.001100
15	60.00	240.00	3.001500	3.000200	3.000800	.001300
16	50.00	200.00	2.520000	2.519500	2.518700	.001300
17	40.00	160.00	2.033300	2.033300	2.037600	.001700
18	30.00	120.00	1.559400	1.558000	1.557700	.001700
19	20.00	80.00	1.080000	1.079900	1.079200	.000800
20	10.00	40.00	.602200	.601600	.600700	.001500
21	.00	.00	.126900	.125700	.125500	.001400

4/05/66 PRE EMI

TRIAL A

LINE ITEM AA67 P/V 133223-515 S/N 160

TERMINAL LINEARITY

FULL SCALE = 4.797000
 MAX. LINE DEV. = .3899999999E-02 MAX. HYS. DEV. = .750000E-02
 PER CENT = .8130031293E-01 PER CENT = .156348E 00
 SLOPE = .4797000000001E-01
 INTERCEPT = .130600000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.13060	.13060	.000000	.12690	.00370
2	10.00000	.60740	.61030	-.00290	.60220	.00520
3	20.00000	1.08620	1.09000	-.00380	1.08000	.00620
4	30.00000	1.56580	1.56970	-.00390	1.55940	.00640
5	40.00000	2.04660	2.04940	-.00280	2.03930	.00730
6	50.00000	2.52750	2.52910	-.00160	2.52000	.00750
7	60.00000	3.00870	3.00880	-.000100	3.00150	.00720
8	70.00000	3.48870	3.48850	.000200	3.48180	.00690
9	80.00000	3.96970	3.96820	.001500	3.96360	.00610
10	90.00000	4.44940	4.44790	.001500	4.44550	.00390
11	100.00000	4.92760	4.92760	.000000	4.92760	.00000

8/05/66 PRE EMI
 LINE ITEM AA67 P/V 1332293-815 S/N 160

TRIAL B

TERMINAL LINEARITY

FULL SCALE = 4.797000 MAX. LINE DEV. = .2720000004E-02 MAX. HYS. DEV. = .7900000E-02
 PER CENT = .5670210557E-01 PER CENT = .164688E 00
 SLOPE = .4800400000002E-01
 INTERCEPT = .1269000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12690	.12690	.000000	.12670	.00120
2	10.00000	.60480	.60694	-.002140	.60160	.00320
3	20.00000	1.08460	1.08693	-.002380	1.07990	.00470
4	30.00000	1.56430	1.56702	-.002720	1.55800	.00630
5	40.00000	2.04430	2.04706	-.002260	2.03830	.00600
6	50.00000	2.52640	2.52710	-.000700	2.51950	.00690
7	60.00000	3.00810	3.00714	.000960	3.00020	.00790
8	70.00000	3.48850	3.48718	.001320	3.48190	.00660
9	80.00000	3.96890	3.96722	.001680	3.96360	.00530
10	90.00000	4.44970	4.44726	.002440	4.44430	.00540
11	100.00000	4.92730	4.92730	.000000	4.92730	.00000

8/05/66 PRE EMI

TRIAL C

LINE ITEM AA67 P/N 1332293-515 S/N 160

TERMINAL LINEARITY

FULL SCALE = 4.797000
 MAX. LINE DEV. = .2499999995E-02 MAX. HYS. DEV. = .770000E-02
 PER CENT = .5211590567E-01 PER CENT = .160517E-00
 SLOPE = .4802000000000E-01
 INTERCEPT = .1257000000000E-00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.12570	.12570	.000000	.12550	.00020
2	10.00000	.60390	.60590	-.002000	.60070	.00320
3	20.00000	1.08380	1.08610	-.002300	1.07920	.00460
4	30.00000	1.56380	1.56630	-.002500	1.55770	.00610
5	40.00000	2.04450	2.04650	-.002000	2.03760	.00690
6	50.00000	2.52640	2.52670	-.000300	2.51870	.00770
7	60.00000	3.00750	3.00690	.000600	3.00080	.00670
8	70.00000	3.48840	3.48710	.001300	3.48080	.00760
9	80.00000	3.96970	3.96730	.002400	3.96370	.00600
10	90.00000	4.44950	4.44750	.002100	4.44540	.00420
11	100.00000	4.92770	4.92770	.000000	4.92770	.00000

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

FORM 30-830 (7-65)

TM-R-5222

DATE 8/27/66 Post EMI TEST PAGE C-38
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297 EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

LEAKAGE

Chamber Pressure N/A Microns Leakage Rate N/A scc/sec Duration N/A sec.

INSULATION RESISTANCE

Connector J1 between:

Connector J2 between:

Case to pins AD shorted 200K Megohms
Case to pins BC shorted 120K Megohms

Case to pins ABDE shorted 12K Megohms

ISOLATION RESISTANCE

CONTINUITY CHECK

Connector J1 between:

Connector J2 between:

Pins AD shorted to pin
BC shorted 110K Megohms

Pin C and case 0 Ohms

HEATER INPUT POWER

After 1 second of applies power

After 5 minutes of applied power

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

Temp. Monitor N/A MV
Input Voltage N/A VDC
Input Current N/A MA

AMPLIFIER INPUT POWER

With 50K ohm load

Shorted Load

Open Ckt Load

Input Voltage N/A VDC
Input Current N/A MA

N/A VDC
N/A MA

N/A VDC
N/A MA

REVERSE POLARITY

Input Voltage N/A VDC
Input Current N/A MA

N/A VDC
N/A MA

N/A VDC
N/A MA

COMMENTS:

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

FORM 30-830 (7-65)

TM-R-5222

DATE 8/27/66 TEST POST FMI PAGE C-39
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

REGULATION: POWER INPUT	28 ± .10	25.2 ± .10	30.8 ± .10	MAX CHANGE @ 25.2 ± 0.10
OUTPUT (vdc)	<u>4.9495</u>	<u>+4.9411</u>	<u>+4.9423</u>	<u>- 0.0084 VDC</u>
%Δ	<u>0</u>	<u>-0.0169</u>	<u>-0.0145</u>	<u>-0.0169 %</u>

RIPPLE:

INPUT VOLTAGE N/A VDC
INPUT PRESSURE N/A PSIA

OUTPUT VOLTAGE N/A VDC
RIPPLE (PEAK TO PEAK) N/A MV

OSCILLOSCOPE

Sensitivity N/A V/DIV.

Sweep Time N/A MS, DIV

COMMENTS:

DATE 8/27/66 TITLE POST EMI

BAROMETRIC PRESSURE . LINE ITEM 4467
 OUTPUT LEAD 50K S.O. 5/79-6105
 OBSERVER RICHARDS ENGINEER MADISON

P/N 1832293-B15 S/N 160
 E.N.T. 27950 I.C.D. 1T07858
 MODELING. DEV-48

REPEATABILITY

FULL SCALE = 4.804300 MAXIMUM REPEATABILITY = .002500
 PER CENT = .052037

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.141000	.138500	.000000	.002500
2	10.00	40.00	.619700	.619700	.000000	.000000
3	20.00	80.00	1.151800	1.151000	.000800	.000800
4	30.00	120.00	1.581000	1.580400	.000600	.000600
5	40.00	160.00	2.059400	2.059200	.000200	.000200
6	50.00	200.00	2.540400	2.540600	.000200	.000200
7	60.00	240.00	3.022700	3.023400	.000700	.000700
8	70.00	280.00	3.500300	3.501500	.001200	.001200
9	80.00	320.00	3.979400	3.981100	.001700	.001700
10	90.00	360.00	4.462900	4.464300	.001400	.001400
11	100.00	400.00	4.945300	4.945600	.000300	.000300
12	90.00	360.00	4.460100	4.460800	.000700	.000700
13	80.00	320.00	3.975000	3.974900	.000100	.000100
14	70.00	280.00	3.494100	3.493400	.000700	.000700
15	60.00	240.00	3.015700	3.015100	.000600	.000600
16	50.00	200.00	2.534100	2.532700	.001400	.001400
17	40.00	160.00	2.052400	2.051800	.000600	.000600
18	30.00	120.00	1.575200	1.574100	.001100	.001100
19	20.00	80.00	1.096900	1.096300	.000600	.000600
20	10.00	40.00	.616000	.614200	.001800	.001800
21	.00	.00	.138500	.138200	.000300	.000300

3/27/66 POST EMI

TRIAL A

LINE ITEM AA67 P/N 1B32293-315 S/N 160

TERMINAL LINEARITY

MAX. LINE DEV. = .6214300000E 00 MAX. HYS. DEV. = .1410000E 00

FULL SCALE = 4.804300

PER CENT = .1049060215E 00

PER CENT = .151947E 00

SLOPE = .430430000000E-01

INTERCEPT = .141000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.14100	.14100	.000000	.13850	.00250
2	10.00000	.61970	.62143	-.001730	.61500	.00470
3	20.00000	1.10180	1.10186	-.000060	1.09690	.00490
4	30.00000	1.58100	1.58229	-.001290	1.57520	.00580
5	40.00000	2.05910	2.06272	-.003620	2.05240	.00670
6	50.00000	2.54040	2.54315	-.002750	2.53310	.00730
7	60.00000	3.02270	3.02358	-.000880	3.01870	.00400
8	70.00000	3.50030	3.50401	-.003710	3.49410	.00620
9	80.00000	3.97240	3.98444	-.012040	3.97500	.00440
10	90.00000	4.44620	4.46437	-.018170	4.46010	.00280
11	100.00000	4.94530	4.94530	.000000	4.94530	.00000

8/27/66 POST EMI

LINE ITEM AA67 P/V 1832203-815 S/W 160

TRIAL 3

TERMINAL LINEARITY

MAX. LINE DEV. = .6192100000E 00 MAX. HYS. DEV. = .138500E 00

FULL SCALE = 4.804300

PER CENT = .6410923537E-01

PER CENT = .172762E 00

SLOPE = .480710000000E-01

INTERCEPT = .138500000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	0.00000	.13350	.13350	.000000	.13220	.00030
2	10.00000	.61920	.61921	-.000010	.61420	.00500
3	20.00000	1.10100	1.09992	.001080	1.09530	.00570
4	30.00000	1.58040	1.58053	-.000130	1.57410	.00630
5	40.00000	2.05920	2.05134	.007860	2.05180	.00740
6	50.00000	2.54060	2.54200	-.001400	2.53270	.00790
7	60.00000	3.02340	3.02276	.000640	3.01510	.00830
8	70.00000	3.50150	3.50347	-.001970	3.49340	.00810
9	80.00000	3.98110	3.98418	-.003080	3.97490	.00620
10	90.00000	4.46430	4.46489	-.000590	4.46050	.00380
11	100.00000	4.94560	4.94560	.000000	4.94560	.00000

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

FORM 30-830 (7-66)

TM-R-5222

DATE 8-29-66

HUMIDITY

TEST

PAGE C-43

SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER

TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE

OBJECT OF THIS DATA is to present the results of the Humidity Test

OBSERVER M. MILLER

LABORATORY A-297-EE/G&C

ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

HUMIDITY

INSULATION RESISTANCE

DATE	CYCLE NO	J ₁ CASE AND PIN AD	CONNECTOR J ₁ PIN BC	CASE & CONNECTOR J ₂ - PINS ABDE	CONNECTOR J ₁ BETWEEN PIN AD AND PIN BC
8-29	0				
8-30	1	15KM Ω	15KM Ω	650M Ω	15KM Ω
8-31	2	15KM Ω	20KM Ω	260M Ω	20KM Ω
9-1	3	25KM Ω	30KM Ω	750M Ω	20KM Ω
9-2	4	50KM Ω	50KM Ω	620M Ω	20KM Ω
9-6	5	20KM Ω	20KM Ω	250M Ω	10KM Ω
9-7	6	20KM Ω	20KM Ω	300M Ω	10KM Ω
9-8	7	20KM Ω	15KM Ω	350M Ω	10KM Ω
9-9	8	20KM Ω	15KM Ω	325M Ω	10KM Ω
9-12	9	40KM Ω	40KM Ω	680M Ω	30KM Ω
9-13	10	50KM Ω	50KM Ω	400M Ω	30KM Ω

COMMENTS:

DATE 9/13/66 TEST POST HUMIDITY
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER A.C. RICHARDS LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67

P/N 1B32293-515

S/N 160

REGULATION: POWER INPUT	28 ± .10	25.2 ± .10	30.8 ± .10	MAX CHANGE @ 25.2 ± 0.10
OUTPUT (vdc)	<u>4.9622</u>	<u>4.9586</u>	<u>4.9600</u>	<u>0.0036 VDC</u>
%Δ	<u>0</u>	<u>-0.072</u>	<u>-0.044</u>	<u>-0.072%</u>

RIPPLE:

INPUT VOLTAGE N/A VDC
INPUT PRESSURE N/A PSIA

OUTPUT VOLTAGE N/A VDC
RIPPLE (PEAK TO PEAK) N/A MV

OSCILLOSCOPE

Sensitivity N/A V/DIV.

Sweep Time N/A MS/DIV

COMMENTS:

DATE 9-13-56 TITLE POST HUMIDITY

PARTIETRIC PRESSURE

OUTPUT LOAD 50K

OBSERVER AD. RICHARDS

LINE ITEM AA67

S.D. 5777-6105

ENGINEER D. MADISON

P/N 1932293-515

E.A.D. 27950

MODEL NO. 05V-43

S/V 160

T.C.D. 1T07854

REPEATABILITY

FULL SCALE = 4-512800 MAXIMUM REPEATABILITY = .005400
PER CENT = .112812

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	0.00	0.00	1.52900	1.52900	0.00000	0.00000
2	10.00	40.00	1.63100	1.63100	0.00000	0.00000
3	20.00	80.00	1.115400	1.111400	0.00000	0.004000
4	30.00	120.00	1.594000	1.591600	0.00000	0.002400
5	40.00	160.00	2.080100	2.075600	0.00000	0.004500
6	50.00	200.00	2.563100	2.558200	0.00000	0.004900
7	60.00	240.00	3.043100	3.038100	0.00000	0.005000
8	70.00	280.00	3.522100	3.517500	0.00000	0.004600
9	80.00	320.00	4.004700	4.002300	0.00000	0.002400
10	90.00	360.00	4.487100	4.481700	0.00000	0.005400
11	100.00	400.00	4.965200	4.962600	0.00000	0.002600
12	90.00	360.00	4.482000	4.480700	0.00000	0.001300
13	80.00	320.00	3.996300	3.995500	0.00000	0.000800
14	70.00	280.00	3.509500	3.505700	0.00000	0.003800
15	60.00	240.00	3.029100	3.025700	0.00000	0.003400
16	50.00	200.00	2.547800	2.545200	0.00000	0.002600
17	40.00	160.00	2.067100	2.063300	0.00000	0.003800
18	30.00	120.00	1.584100	1.581500	0.00000	0.002600
19	20.00	80.00	1.104700	1.102300	0.00000	0.002400
20	10.00	40.00	0.626200	0.623800	0.00000	0.002400
21	0.00	0.00	0.149900	0.143300	0.00000	0.006600

9/13/60 POST HUMIDITY

TRIAL A

LINS ITEM AA47 P/N 1838293-515 S/N 160

TERMINAL LINEARITY

MAX. LINE DEV. = +.0300000018E-02 MAX. HYS. DEV. = +.1400000E-01
 FULL SCALE = +.812300 PER CENT = +.8415934206E-01 PER CENT = +.290921E-00
 SLOPE = +.45123000000000E-01
 INTERCEPT = +.16270000000000E-00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	+00000	+15490	+15490	+000000	+14990	+00300
2	10+00000	+43010	+43010	+000000	+62620	+00890
3	20+00000	+111940	+111936	+0000+0	+110470	+01070
4	30+00000	+159600	+159600	+000000	+158410	+01190
5	+0+00000	+203010	+2037782	+002280	+206710	+01300
6	50+00000	+256810	+256905	+00+000	+254980	+01330
7	60+00000	+304310	+304028	+002820	+302910	+01400
8	70+00000	+353210	+3532151	+000590	+350950	+01260
9	80+00000	+400470	+400274	+001960	+399630	+00840
10	90+00000	+448710	+448397	+003130	+448250	+00460
11	100+00000	+496920	+496522	+000000	+496520	+00000

9/13/86 RST HUMIDITY

TRIAL 8

LINE ITEM A467 P/N 1532293-515 S/N 160

TERMINAL LINEARITY

FULL SCALE = 4.312300
 MAX. LINE DEV. = .2240000002E-02 MAX. HYS. DEV. = .124000E-01
 PER CENT = .4654733902E-01 PER CENT = .257673E 00
 SLOPE = .4312700000000E-01
 INTERCEPT = .1499000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	.00000	.14990	.14990	.000000	.14930	.00160
2	10.00000	.63180	.63117	.000630	.62380	.00800
3	20.00000	1.11140	1.11244	-.001040	1.10230	.00910
4	30.00000	1.59160	1.59371	-.002110	1.58130	.01030
5	40.00000	2.07560	2.07438	.000220	2.06380	.01180
6	50.00000	2.55820	2.55645	.001750	2.54620	.01200
7	60.00000	3.03810	3.03752	.000580	3.02570	.01240
8	70.00000	3.51750	3.51379	-.001290	3.50570	.01180
9	80.00000	4.00250	4.00309	-.000240	3.99550	.00680
10	90.00000	4.48170	4.48138	.000370	4.48070	.00100
11	100.00000	4.96260	4.96260	.000000	4.96260	.00000

274 1032220-810 8/4.150
S. 4. 27260 1. C. D. 110785
MOOSE 10. 1007-41

8/2/68 0414 PROJE PREPARE
LINE ITEM 4467 P/N 1832893-013 S/N 160

TRIAL A

TERMINAL LINEARITY

MAX. LINE DEVI. A = +0013099793E+02 MAX. SYS. DEVI. = +840000E+02
FULL SCALE = +.803800 PER CENT = +8859673917E-01 PER CENT = +174680E 00

SLOPE = +.480880010000E+01
INTERCEPT = +149100000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT Y	RESIDUAL Y1-Y	INPUT Y2	SYS. Y1-Y2
1	+0.0000	+1.4910	+1.4910	+000000	+1.4570	+00340
2	10.00000	+6.7330	+6.2228	+001930	+6.2300	+00500
3	20.00000	1.10740	1.11784	+003444	1.10730	+00510
4	30.00100	1.68490	1.69174	+002840	1.68050	+00840
5	40.00100	2.05160	2.07268	+004020	2.06300	+00560
6	50.00100	2.65840	2.65351	+001100	2.64610	+00780
7	60.00100	3.03150	3.03486	+002820	3.02450	+00700
8	70.00100	3.51220	3.51526	+003260	3.50560	+00660
9	80.00100	3.93700	3.93614	+00280	3.92270	+00430
10	90.00000	4.48020	4.47702	+003160	4.47400	+00220
11	100.00000	4.95790	4.95700	+000900	4.95790	+00000

3/20/68 PRL-28358 2428503C
 LINE 115- 4457 744 1832293-515 S/N 180

TRIAL 3

TERMINAL LINEARITY

MAX. LINE DEV. = +.3370000043E-02 MAX. HYB. DEV. = +.9200000E-02
 FULL SCALE = +.598400 PER CENT = +.7207985463E-01 PER CENT = +.1913165 00

SCORE = +.440469939309E+01
 INTERCEPT = +.146700000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYB. Y1-Y2
1	+00000	+14370	+14370	+000000	+14450	+00120
2	10+00000	+52681	+52687	+000000	+52150	+00530
3	20+00000	1+10610	1+10744	-+001340	1+10810	+00600
4	30+00000	1+38360	1+38481	-+001210	1+37900	+00660
5	40+00000	2+06810	2+06718	+000930	2+06060	+00750
6	50+00000	2+35121	2+35003	+001180	2+34820	+00840
7	60+00000	3+03060	3+03092	-+000320	3+02140	+00920
8	70+00000	3+31060	3+31173	-+001130	3+30310	+00750
9	80+00000	3+99371	3+99266	+001040	3+98940	+00630
10	90+00000	4+47590	4+47353	+002370	4+47410	+00280
11	100+00000	4+95440	4+95440	+000000	4+95440	+00000

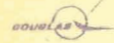
6/25/78 1987 04750 00000000
LINE ITEM 0047 P/N 183223-515 S/V 150

151A_0

TERMINAL LINEARITY

MAX. LINE DEV. = +.3989999999E-02 MAX. HYS. DEV. = +.8500000E-02
FULL SCALE = 4.478900 PER CENT = +.8172517000E-01 PER CENT = +.176759E 00
SLOPE = +.4411079999999E-01
INTERCEPT = +.1443000000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT Y	RESIDUAL Y1-Y	INPUT Y2	HYS. Y1-Y2
1	0.0000	0.14450	0.14450	0.000000	0.14360	0.00090
2	1.00000	0.52060	0.52060	0.000000	0.52060	0.00000
3	2.00000	1.09940	1.09940	0.000000	1.09940	0.00000
4	3.00000	1.57820	1.57820	0.000000	1.57820	0.00000
5	4.00000	2.05690	2.05690	0.000000	2.05690	0.00000
6	5.00000	2.53560	2.53560	0.000000	2.53560	0.00000
7	6.00000	3.01430	3.01430	0.000000	3.01430	0.00000
8	7.00000	3.49300	3.49300	0.000000	3.49300	0.00000
9	8.00000	3.97170	3.97170	0.000000	3.97170	0.00000
10	9.00000	4.45040	4.45040	0.000000	4.45040	0.00000
11	10.00000	4.92910	4.92910	0.000000	4.92910	0.00000



MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

DATA SHEET

TM-R-5222

FORM 30-830 (7-66)

DATE 9/20/66 PROOF PRESSURE TEST PAGE C-52
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

OBSERVER W. BOYLES LABORATORY A-297-EE/G&C ENGINEER MADISON

GTP: AA67

P/N 1B32293-515

S/N 160

PROOF PRESSURE

PRESS PSIA	OUTPUT VOLTS
400	4.9566
425	5.2639
450	5.5554
475	5.7931
500	5.9650
525	6.0201
550	6.0437
575	6.0448
600	6.0450

TIME MINUTES	OUTPUT VOLTS	PRESS PSIA
0.0	6.0450	600
0.5		
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5.0		

BURST PRESSURE

PRESS. PSIA	OUTPUT VOLTS
400	N/A
1000	N/A
2000	N/A
3000	N/A
4000	N/A
5000	N/A
6000	N/A
7000	N/A
8000	N/A
9000	N/A
10000	N/A

TIME SECONDS	OUTPUT VOLTS	PRESS. PSIA
0	N/A	N/A
5	N/A	N/A
10	N/A	N/A
15	N/A	N/A
20	N/A	N/A
25	N/A	N/A
30	N/A	N/A

DATA SHEET

MISSILE & SPACE SYSTEMS DIVISION DOUGLAS AIRCRAFT COMPANY, INC.

FORM 30-830 (7-55)

TM-R-5222

DATE 9-21-66 POST ENVIRONMENTAL TEST PAGE C-53
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the GTP LINE ITEM AA67

OBSERVER T. YONEYAMA LABORATORY A-297 EE/G&C ENGINEER MADISON

GTP: AA67

P/N 1B32293- 515

S/N 160

LEAKAGE

Chamber Pressure 10 Microns Leakage Rate 2.5×10^{-8} scc/sec Duration 120 sec.

INSULATION RESISTANCE

Connector J1 between:

Case to pins AD shorted 70 K Megohms
Case to pins BC shorted 50 K Megohms

Connector J2 between:

Case to pins ABDE shorted 1.8 K Megohms

ISOLATION RESISTANCE

Connector J1 between:

Pins AD shorted to pin
BC shorted 14 K Megohms

CONTINUITY CHECK

Connector J2 between:

Pin C and case .0142 Ohms

HEATER INPUT POWER

After 1 second of applies power

Temp. Monitor 70.9 MV
Input Voltage 28.00 VDC
Input Current 870 MA

After 5 minutes of applied power

Temp. Monitor 84.8 MV
Input Voltage 28.0 VDC
Input Current 603.0 MA

AMPLIFIER INPUT POWER

With 50K ohm load

Input Voltage 28.00 VDC
Input Current 33 MA

Shorted Load

28.00 VDC
33 MA

Open Ckt Load

28.00 VDC
33 MA

REVERSE POLARITY

Input Voltage 28.00 VDC
Input Current 12.9 MA

28.00 VDC
12.9 MA

28.00 VDC
12.9 MA

COMMENTS:



MISSILE & SPACE SYSTEMS DIVISION
DOUGLAS AIRCRAFT COMPANY, INC.

DATA SHEET

FORM 30-830 (7-65)

TM-R-5222
C-54

DATE 9-21-66 POST ENVIRONMENTAL TEST
SUBJECT QUALIFICATION TEST OF A HEATED, HIGH ACCURACY, PRESSURE TRANSDUCER
TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
OBJECT OF THIS DATA is to present the results of the

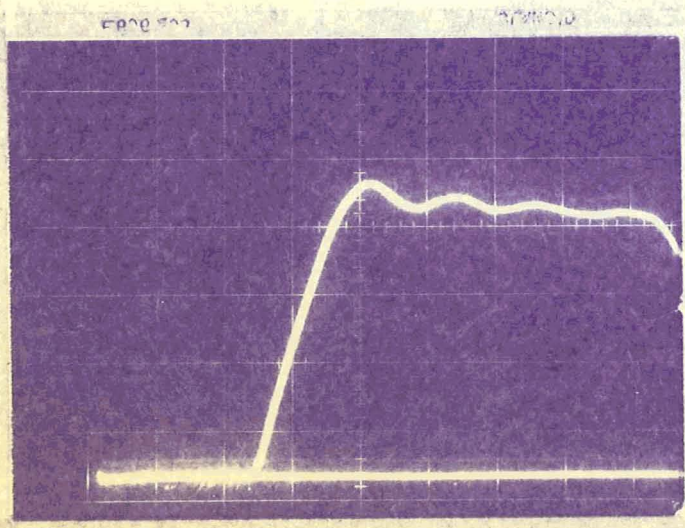
OBSERVER T. YONEYAMA LABORATORY A-297-EE/G&C ENGINEER C. BERING

GTP: AA67 P/N 1B32293-515 S/N 160

AMPLIFIER OUT IMPEDANCE

Input Voltage	<u>28.00VDC</u>
Input Pressure	<u>400 PSIA</u>
No Load Output	<u>4.9841VDC</u>
50K Load Output	<u>4.9523VDC</u>
Resistance for 90% Load	<u>N/A OHMS</u>
Output Impedance	<u>321 OHMS</u>

AMPLIFIER FREQUENCY RESPONSE



Oscilloscope

Sensitivity 1 V/DIV
Sweep Time 2 MS/DIV
Over Shoot 4.8 %
Time Period "T" 2.4 MS
Trans.Freq. =F 420 CPS
Damping Ratio 0.69
Natural Freq.=F_N 530 CPS
Freq Response=FR 228 CPS

COMMENTS:

DATE 9/21/66 POST ENVIRONMENTAL TEST
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TEST NO. S.O. 5779-6105 E.W.O. 27980 T.C.D. 1T07858 MODEL NO. DSV-4B-436-GSE
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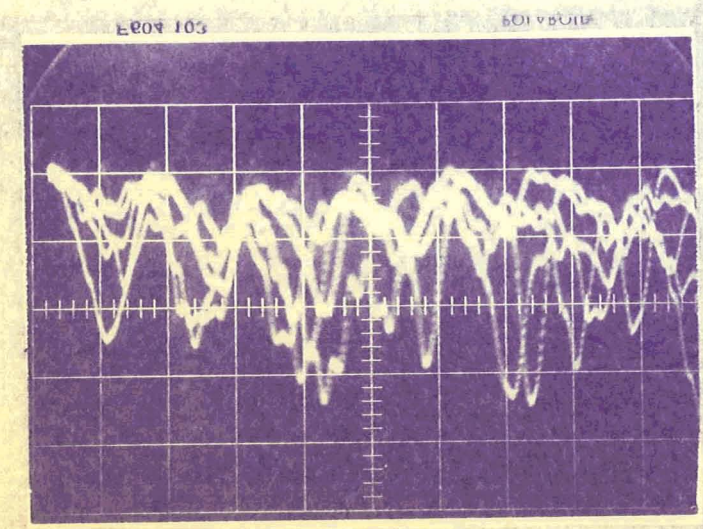
GTP: AA67 P/N 1B32293-515 S/N 160

REGULATION: POWER INPUT	<u>28 ± .10</u>	<u>25.2 ± .10</u>	<u>30.8 ± .10</u>	MAX CHANGE	<u>25.2 VDC</u>
OUTPUT (vdc)	<u>4.9537</u>	<u>4.9504</u>	<u>4.9546</u>		<u>0.0033 VDC</u>
%Δ	<u>0</u>	<u>-0.066%</u>	<u>0.018%</u>		<u>-0.066%</u>

RIPPLE:

INPUT VOLTAGE 28 VDC
INPUT PRESSURE AMB PSIA

OUTPUT VOLTAGE — VDC
RIPPLE (PEAK TO PEAK) 1.6 MV



OSCILLOSCOPE

Sensitivity 500uV/DIV.
Sweep Time 2 MS/DIV

COMMENTS:

DATE 11/21/65 TITLE PIST PRESS PRESSURE
 MAKE PIST PRESSURE LINE ITEM #A67
 11/21/65 11/21/65 5.31 5770-6105
 1332283-31 ENGINEER MADISON

3/4 1332283-31 3/4 160
 1.4.2. 27980 1.0.0. 1707855
 MODEL NO. 03V-43

REPEATABILITY

FULL SCALE = 14.80+500 MAXIMUM REPEATABILITY = .004400
 PER CENT = .091581

POINT	PERCENT	PSIA	TRIAL A	TRIAL B	TRIAL C	DIFFERENCES
1	.00	.00	.153000	.152600	.153400	.000800
2	10.00	40.00	.532300	.532400	.533300	.001000
3	20.00	80.00	1.111100	1.111600	1.112100	.001000
4	30.00	120.00	1.593100	1.593000	1.591300	.001200
5	40.00	160.00	2.072600	2.073400	2.073900	.001300
6	50.00	200.00	2.554000	2.554000	2.554400	.000400
7	60.00	240.00	3.032300	3.034500	3.033500	.002700
8	70.00	280.00	3.512600	3.514500	3.514500	.001900
9	80.00	320.00	3.993700	3.999100	3.993900	.003200
10	90.00	360.00	4.473600	4.482100	4.484000	.004400
11	100.00	400.00	4.957500	4.958600	4.967700	.003200
12	110.00	440.00	4.477100	4.478600	4.480700	.000600
13	120.00	480.00	3.992400	3.994400	3.995500	.003100
14	130.00	520.00	3.507100	3.508200	3.509700	.002600
15	140.00	560.00	3.023100	3.023100	3.023400	.001300
16	150.00	600.00	2.549000	2.549400	2.550200	.001200
17	160.00	640.00	2.067100	2.067800	2.068000	.000900
18	170.00	680.00	1.585900	1.585900	1.586100	.000200
19	180.00	720.00	1.107200	1.107600	1.107500	.000400
20	190.00	760.00	.629600	.629400	.629900	.000300
21	.00	.00	.152600	.153200	.152600	.000600

POST PRESSURE

TRIAL A

LINE ITEM 1167 3/4 134223-515 3/4 150

TERMINAL LINEARITY

MAX. LINE DEV. = .42499999E-02 MAX. HYS. DEV. = .550000E-02

FULL SCALE = 4.314300

PER CENT = .3843873526E-01

PER CENT = .114476E-00

SLOPE = .48044803999E-01

INTERCEPT = .16330000000E-02

POINT	INPUT X	INPUT Y1	OUTPUT F	RESIDUAL Y1-F	INPUT Y2	HYS. Y1-Y2
1	0.00000	.16300	.16300	.000000	.16260	.00040
2	10.00000	.63230	.63240	-.000100	.62950	.00270
3	20.00000	1.11110	1.11390	-.002800	1.10720	.00390
4	30.00000	1.59000	1.59480	-.004800	1.58500	.00420
5	40.00000	2.07260	2.07480	-.002200	2.06710	.00550
6	50.00000	2.55400	2.55820	-.004200	2.54900	.00500
7	60.00000	3.03260	3.03570	-.003100	3.02810	.00470
8	70.00000	3.51280	3.51610	-.003300	3.50710	.00550
9	80.00000	3.99370	3.99860	-.004900	3.98840	.00530
10	90.00000	4.47260	4.47700	-.004400	4.47210	.00050
11	100.00000	4.95750	4.95750	.000000	4.95750	.00000

37 1000 01ST 0000 PRESSURE
 1 0 1000 0000 P/V 1000000000 000 000 100

TRIAL 3

TERMINAL LINEARITY

MAX. LINE DEV. = +4100000000E-02 MAX. HYS. DEV. = +640000E-02
 PER CENT = +8533666306E-01 PER CENT = +133208E 00
 SLOPE = +4300000000E-01
 INTERCEPT = +15260000000E 00

POINT	INPUT X	INPUT Y1	OUTPUT Y	RESIDUAL Y1-Y	INPUT Y2	HYS. Y1-Y2
1	0.0000	0.1526	0.1526	0.0000	0.1332	-0.0000
2	10.0000	0.6324	0.6324	-0.0000	0.6299	-0.0025
3	20.0000	1.1126	1.1138	-0.0012	1.1076	-0.0050
4	30.0000	1.5924	1.5940	-0.0016	1.5859	-0.0060
5	40.0000	2.0724	2.0750	-0.0026	2.0678	-0.0046
6	50.0000	2.5524	2.5556	-0.0032	2.5493	-0.0031
7	60.0000	3.0324	3.0362	-0.0038	3.0281	-0.0043
8	70.0000	3.5124	3.5168	-0.0044	3.5089	-0.0035
9	80.0000	3.9924	3.9974	-0.0050	3.9940	-0.0034
10	90.0000	4.4724	4.4780	-0.0056	4.4796	+0.0072
11	100.0000	4.9524	4.9580	-0.0056	4.9586	+0.0062

3/21/55 DIST. 4755 PRESSURE

TRIAL C

LINE 114 1457 1474 1478237-515 475 150

TERMINAL LINEARITY

MAX. LINE DEV. = +.2509999995-02 MAX. HYS. DEV. = +.62000002-02

COIL SCALE = 4.894500

PER CENT = +.39271280202-01

PER CENT = +.1290465 00

SLIP = +.1072280000000-01

INTERCEPT = +.1584000000000-00

POINT	INPUT X	INPUT Y1	OUTPUT Y	RESIDUAL Y1-Y	INPUT Y2	HYS. Y1-Y2
1	0.00000	0.15340	0.15340	0.000000	0.15260	0.00080
2	10.00000	0.63070	0.63070	-0.000830	0.62990	0.00080
3	20.00000	1.11410	1.11485	-0.000760	1.113750	0.00040
4	30.00000	1.59710	1.59850	-0.001400	1.59610	0.00100
5	40.00000	2.07870	2.07830	0.000400	2.07800	0.00070
6	50.00000	2.55710	2.55705	0.000050	2.55620	0.00090
7	60.00000	3.03550	3.03775	-0.002250	3.03440	0.00110
8	70.00000	3.51450	3.51451	-0.000010	3.51370	0.00080
9	80.00000	3.99390	3.99324	0.000660	3.99350	0.00040
10	90.00000	4.47300	4.47487	-0.001870	4.47370	0.00070
11	100.00000	4.95270	4.95370	-0.001000	4.95370	0.00100



REPORT SUMMARY SHEET

C-60

1. COMPONENT PART NAME PER GENERIC CODE TRANSDUCER, PRESSURE GAS, VOLTAGE		2. PROGRAM OR WEAPON SYSTEM SATURN		3. DAY MO. YR. 5 8 66	
4. ORIGINATOR'S REPORT TITLE PRESSURE TRANSDUCER HIGH ACCURACY, HEATED GSE QUALIFICATION TEST, P/N 1B32293-515		5. ORIGINATOR'S REPORT NO. TM-DSV-4B-EE-R-5222		REPT. COMPL.	
		6. TEST TYPE, ETC. QUALIFICATION			

7. THIS TEST (SUPERSEDES) (SUPPLEMENTS) REPORT NO:

8. ITEM	8A. PART TYPE, SIZE, RATING, LOT, ETC.	9. VENDOR	10. VENDOR PART NO.	11. IND./GOV. STD. NO.	12. TOTAL TESTED
1	S/N 160	Data Sensors	PBA 703A-3-400	None	1
2					
3					
4					

(OVER)

13. INTERNAL SPECS. ETC. REQ'D TO UTILIZE REPT.		14. MIL. SPECS./STDS. REFERENCED IN 15C	
A None	SENT WITH REPORT NO. None	D None	
B		E	
C		F	

15A. TEST OR ENVIRONMENT	C PER SPEC	D SPEC. PARAGRAPH/METHOD/CONDITION	E TEST LEVELS, DURATION AND OTHER DETAILS	F NO. TESTED	G NO. FAILED
ROOM TEMPERATURE		Insulation & Isolation Resistance, Input Power, Regulation, Automatic Electrical Calibration, Pressure Calibration, Ripple, +125°F for 12 hours, pressure calibration. Output impedance.		1	0
HIGH TEMPERATURE				1	0
LOW TEMPERATURE		0°F for 12 hours, pressure calibration.		1	0
EMI		As reported in TM-R-5222-1.		1	0
HUMIDITY		10 - 24 hour cycles - 95% humidity. From +86 ± 14°F to 160°F 6 hours @ +160°F, 16 hours return to +86°F.	2 Hrs.	1	0
PROOF PRESSURE		600 psia for 5 minutes.		1	0
BURST PRESSURE		10000 psia.		1	0

(OVER)

16. SUMMARY OF REPORT, NATURE OF FAILURES AND CORRECTIVE ACTIONS TAKEN:

The transducer was subjected to pre-environmental, high temperature, low temperature, environments to qualify them for use on the Saturn DSV-4B vehicle. Out of tolerances were noted with respect to repeatability, combined error band, and hysteresis during the temperature environments. All other design specifications were met.

(OVER)

17. TESTED BEYOND VENDOR CATALOG SPECIFICATIONS	YES <input type="checkbox"/>	18. VENDOR INFORMED OF TEST RESULT BY: LETTER <input checked="" type="checkbox"/> CY OF REPT <input type="checkbox"/> ORAL <input checked="" type="checkbox"/>	19. SIGNED	20. CONTRACTOR Douglas Aircraft Co.	SUBCONTRACTOR
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21. REPT. NO. 852.50.85

REPRODUCTION OR DISPLAY OF THIS MATERIAL FOR SALES OR PUBLICITY PURPOSES IS PROHIBITED.